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**Relationship of Alexithymia to Mental Imagery
and Cognitive Style**

by



Kirk R. Bates

**M. A. University of Windsor, 1983
B. A. Dalhousie University, 1980**

**A Dissertation
submitted to the
Faculty of Graduate Studies and Research
through the Department of Psychology
in partial fulfillment of the requirements
for the Degree of
Doctor of Philosophy at
the University of Windsor**

Windsor, Ontario, Canada

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ABSTRACT

A number of investigators have contended that individuals exhibiting alexithymic traits also have deficits in mental imagery ability. As well, several authors have proposed that alexithymia involves a cognitive style based on decreased reliance on right-hemisphere mediated processes and increased reliance on left-hemisphere mediated processes. However, no previous researcher has systematically examined the ability of those manifesting alexithymic traits to produce imagery. Nor, has any researcher examined the relationship between alexithymia and the styles of cognitive function that are supposedly connected to hemispheric laterality.

In the present study, the author examined the relationship between the several traits of the alexithymia construct and the various dimensions of imagery in clinical (pain) and nonclinical subjects. The author used these multiple imagery variables because he was alert to the complexity of how persons produce and use imagery. The author hypothesized that deficits in imagery ability would be positively related to alexithymic deficits. He found, however, that measures of alexithymia were independent of measures of directed imagery, that is, imagery in which subjects are instructed to image. He found only one type of imagery, spontaneous, daydream imagery of an emotionally negative tone, to be related to alexithymia. Findings were the same in the clinical group and the nonclinical group.

The author also examined the relationship between hemisphere-related cognitive style and the traits of alexithymia. The author hypothesized that alexithymic traits would be positively correlated with a left-hemisphere cognitive style and negatively correlated with a right-hemisphere style. On the whole, the results showed that alexithymia is not related to cognitive style in either the clinical group or the nonclinical group.

In discussing these results, which indicated that alexithymic individuals have the ability to use directed imagery, the author emphasized their implications for study of the alexithymia construct and for doing clinical work with alexithymic patients.

Because the subjects' scores on all subscales of the Toronto Alexithymia Scale were not in the same direction, the author concluded that this scale may not be a valid measure of an overall, coherent disposition. Accordingly, future researchers should exercise caution in using this measure.

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CHAPTER I

INTRODUCTION

In 1972 Sifneos coined the term "alexithymia," which means literally, "No words for feelings." Alexithymia, as he proposed, is a multitrait construct involving a cognitive-affective disturbance that includes three essential features: difficulty in awareness and expression of feelings, impoverishment of fantasy processes, and a concrete, practical, and excessively reality-bound cognitive style - - a style that can be recognized by the person's verbalizations, which are utilitarian and are focused on the external environment (Sifneos, 1973). Because it was in his clinical work with psychosomatic patients that Sifneos became aware of this phenomenon, he proposed that alexithymia is a primary characteristic of many such patients (1973).

Many researchers from around the world, making use of clinical observations, have described the features of alexithymia with remarkable consistency. They have generally concurred with Sifneos' description of the construct. Some have proposed neurological models of cerebral, hemispheric laterality as an etiological explanation of alexithymia. These authors have suggested that alexithymia is related to a cognitive style dimension that involves decreased reliance on right-hemisphere mediated processes and increased reliance on left-hemisphere mediated processes (Shipko, 1982a). Other researchers have suggested that those exhibiting alexithymic traits also exhibit an imagery deficit; they believe that the neurological models just outlined predict such a deficit. However, no researchers have yet studied whether those displaying characteristics consistent with the alexithymia construct do in fact exhibit imagery deficits.

The present study empirically examined the relationship between the nature and degree of abilities or preferences in mental imagery, on the one hand, and alexithymic traits, on the other. Such a study should extend our knowledge of the alexithymia construct itself and our information about the validity of some of the instruments frequently used to measure it. Specifically, this study explored the relationship between various types of mental imagery and the several traits of the alexithymia construct. Finally, the present study explored the relationship between alexithymia and a cognitive style dimension related to cerebral, hemispheric laterality. In order to further explicate the rationale for the present study, the author now provides a review of the pertinent literature.

Clinical Description of Alexithymia

Because alexithymia is a clinically derived construct, and because the author's interest in alexithymia grew out of his clinical experience, it is appropriate to begin with a presentation of the clinical literature. In working therapeutically with clients who appeared to exhibit alexithymic characteristics, the author had attempted to use instructed imagery techniques. He found, however, that some of these clients could make little use of imagery and reported little awareness of using imagery spontaneously in their everyday lives. Other clients reported that they could not image a clear picture of certain types of images in their minds eye. Thus, the researcher gradually developed an interest in the possible relationship between imagery and alexithymia; this interest led him to undertake the current research. The review that follows has two parts. The first is a review of the alexithymia construct; the second is a review of the relevant literature on mental imagery as it might relate to alexithymia.

Before Sifneos (1972) coined the term "alexithymia," the literature on psychosomatic illness included many psychological descriptions of patients who appear to be similar to those

who are now often designated as alexithymic (see Alexander, 1950; Brown, 1967; Freedman & Sweet, 1954; Gildea, 1949; McDougall, 1974; Ruesch, 1957; M. Singer, 1977). As previously indicated, Sifneos (1967) and Nemiah and Sifneos (1970), representing the so-called Boston school, observed a similar set of characteristics in psychosomatic patients and referred to these as alexithymia. Sifneos (1972) was the first researcher in North America to label this syndrome, presenting it as a distinct construct. In Europe, however, the so-called French school (Fain & Marty, 1964; Marty & de M'Uzan, 1963; de M'Uzan & David, 1960), had already used the term "la pensée opératoire" (concrete-operational thinking) to label "a psychosomatic structure" that is now generally accepted to be the same as alexithymia. Whereas the Boston group emphasized affective deficits, the French researchers emphasized the psychosomatic patients' deficits in fantasy life and thought content, indicating that the latter are preoccupied with the minutiae of their external environment and daily activities. In Germany, Stephanos' (1973) reference to "psychosomatisches Phänomen" is believed to refer to a construct similar to la pensée opératoire and alexithymia.

As can be seen from this brief review, Lesser's (1981) observation that alexithymia, "although a new word, . . . does not embody a novel idea" (p. 532), seems accurate. As Wolff (1977a) maintains, alexithymia is not a new phenomenon and has not been "discovered." Obviously, "the concept of 'alexithymia' is rooted in a large body of consistent clinical and phenomenological observations" (Lesser, 1981, p. 532). Alexithymia can perhaps best be described, then, as a clinically derived construct, a cluster of psychological traits which has been recognized to exist in many psychosomatic patients, and in others.

A word of caution regarding the use of the term "alexithymia" is in order at this point. In referring to individuals or groups of people, one should perhaps more properly write "those who exhibit characteristics consistent with the alexithymia construct." Although the author employs

words such as "alexithymia," "alexithymic," and "alexithymics" here as a convenience in writing. he does not mean to reify this construct by use of such terminology.

Alexithymia, la pensée opératoire, or psychosomatisches Phänomen is clearly then a multitrait construct. As mentioned earlier, Sifneos (1973) suggested that the main features involve difficulties in awareness and expression of feelings, poverty of fantasy processes, and concrete and pragmatic thought processes and verbalizations. As investigations have continued, various researchers have emphasized different components of the construct and have suggested both additions and refinements. Alexithymia has been described as including the following: difficulties in experiencing and/or differentiating and/or recognizing and/or identifying (labeling) and/or expressing/verbalizing emotions; diminished ability to symbolize/fantasize/imagine and/or to verbalize these processes (Nemiah, 1975; Sifneos, 1967, 1973); difficulties in abstract thinking with concretistic thought processes; stimulus bound, rather than drive determined, thought (Nemiah, 1975); utilitarian, pragmatic thinking; absence or decreased incidence of dreaming or at least remembering/reporting dreams; poor reality testing; somatic emphasis with emotions experienced and expressed somatically; inability to localize physiological accompaniments of emotions in the body (Nemiah, 1975); lack of awareness of common somatic reactions that accompany a variety of affects (Sifneos, 1973); handling of conflict in an action oriented manner; intolerance for the psychological dimensions of problems; over-adapted to reality (Krystal, 1979); preoccupation with minute and trivial details of external events and the environment (Marty & de M'Uzan, 1963); stiff and wooden presentation (Pinocchio syndrome) (Nemiah, 1978); pragmatic, instrumental, almost mechanical object-relations; impaired capacity for empathy; poor hypnotic subjects (Frankel, Apfel-Savitz, Nemiah, & Sifneos, 1977); decreased incidence of crying or an inability to cry and a flattened affect (Warnes, 1979). From the foregoing description of the alexithymia trait cluster, it is clear that it is characterized more by a lack of function, rather than a

presence of function peculiar to alexithymia (Borens, Grosse-Schulte, Jaensch, & Kortemme, 1977).

A few brief clinical vignettes may provide the reader with a flavour of the clinical presentation of alexithymia. Nemiah and Sifneos (1970) have provided two examples, which are abbreviated for use here. In the first example, the following interchange occurred in a clinical interview with reference to feeling angry:

- Patient: "It gives me some physical disagreeable feeling."
- Interviewer: "Can you explain it?"
- P: "Well, it seems to me that I get a tightness in my chest and throat. I feel inarticulate when I come here and try to explain my feeling to you."
- I: "I think it's very hard for you to talk about feelings."
- P: "When it comes to describing feelings, I seem to be at a loss for words." (p. 29).

The second patient was asked to elaborate on feelings of sadness and anger, which she had reported over a disappointment in marriage plans. She replied:

- P: "I don't seem to think straight. I just go around in circles."
- I: "I wonder what the feeling of sadness is that you have. Is there any way you can describe it?"
- P: "No, I really can't. You don't mean my physical feeling?" (p. 29).

Flannery (1977) also gives a number of similar examples. In response to the interviewer's question, "'What did you feel when you knew your father was dead?,'" one patient said, "'Oh, I think I got a migraine headache,' (indicating a symptom as a reaction to the bad news)," and another said, "'Well, I had to cope with my little brother' (indicating action rather than feeling)" (p. 137).

Although alexithymic individuals may initially speak of feeling "nervous," "sad," or "angry," when pressed to describe these feelings they cannot do so. Such patients may, on occasion, have brief affective outbursts, such as sudden crying or explosive rage. When questioned regarding this however, they are unaware of feeling sad, for example, and cannot explain why they are crying.

As one can see from the clinical description of alexithymia above, it is a complex construct consisting of a number of traits or components. It is not yet known whether, or to what extent, these different components are correlated with one another (Gardos, Schniebolk, Mirin, Wilk, & Rosenthal, 1984), or how they might be patterned in any given individual or group (Lolas, de la Parra, Aronsohn, & Collin, 1980). Sifneos (1977) even suggests, without elaboration, that there may be "several kinds of alexithymia" (p. 369).

Some researchers (e.g., Freyberger, 1977; Nagakawa & Ikemi, 1982; Nemiah, Freyberger, & Sifneos, 1976) have suggested that alexithymia can be differentiated into primary and secondary types. They consider primary alexithymia to have a dispositional or preoedipal origin. These researchers view secondary alexithymia as a protective psychological defense, representing a regression in cognitive and affective development. They see it as a reaction to external stress and is either a transitory state resulting from serious organic disease or trauma (acute secondary alexithymia), or a permanent state due to chronic illness (chronic secondary alexithymia) (Nemiah et al., 1976). Nagakawa and Ikemi (1982), in making a similar distinction, referred to situational versus character psychosomatic disorders.

From the above, it is clear that clinicians do not universally agree on one definition of alexithymia at this point in time. However, for the purposes of this study, the present author used the definition based on the four-factor model of alexithymia as put forth by Taylor and his colleagues (Taylor, Ryan, & Bagby, 1985). These four components of alexithymia are: (1)

difficulty identifying and distinguishing between feelings and bodily sensations, (2) difficulty communicating feelings, (3) reduced daydreaming, and (4) externally oriented thinking. The author chose this definition due to its apparent breadth and ability to capture the important components of the construct as reported in the psychosomatic literature.

Studies of the incidence of alexithymia in psychosomatic patients have yielded varied results. Taylor, Doody and Newman (1981) found no significant differences in degree of alexithymia between patients with inflammatory bowel disease and psychoneurotics. In contrast, Nagakawa, Sugita, Nakai, & Ikemi (1979) found that their psychosomatic patients did indeed manifest a high degree of alexithymia. Kleiger and Jones (1980) found no difference in the frequency of alexithymic characteristics among patients with three different chronic respiratory illnesses, including asthma. Sifneos (1973) reported that 44 % of a group of heterogeneous psychosomatic patients displayed alexithymic characteristics. Fava and Pavan (1977) indicated that over 25 % of ulcerative colitis patients were alexithymic, and this was a higher proportion than patients with other large bowel disorders not traditionally considered psychosomatic. Whereas there appears to be a significant correlation between alexithymia and psychosomatic illness, alexithymia is clearly not universally associated with psychosomatic disease.

Although alexithymia is not universally associated with psychosomatic illness, there may be a significant relationship between alexithymia and disease, and illness behaviours. The latter refers to sickness behaviours in the absence of, or out of proportion to, known pathology. The relationship between alexithymia and disease may not be an etiological one. That is, alexithymia may not, or not always, be a predisposing factor in illness onset. Instead, it may lead to decreased responsiveness to treatment and "psychomaintenance" of the disorder, resulting in the prolongation of the course of disease and/or illness behaviours.

The results of two studies lend support to this hypothesis. Dirks and his colleagues found alexithymia to be correlated with rehospitalization (Dirks, Robinson, & Dirks, 1981) and length of stay (Dirks et al., 1981; Kleiger & Dirks, 1980) in asthma patients. Of course, alexithymia could be a factor in both the psychomaintenance and causation of disease.

In addition, researchers have observed alexithymia in a wide range of other groups, encompassing somatic complaints (e.g., Cooper & Holmstrom, 1984; Flannery, 1977; Heiberg, 1980; Lesser, Ford & Friedmann, 1979; Shipko, 1982b), medical problems (e.g., Kleiger & Jones, 1980; Smith, 1983), pain disorders (e.g., Blumer & Heilbronn, 1982; Cohen, Demers-Desrosiers, & Catchlove, 1983; Demers-Desrosiers, Cohen, Catchlove, & Ramsay, 1983; Lesse, 1977; Mendelson, 1982; Rickels, 1981), and mixed psychiatric diagnoses (e.g., Lesser et al., 1979; Pierloot & Vinck, 1977).

As indicated, many theorists have advocated a role for alexithymia in the production of illness. Some have advocated the view that, in those exhibiting alexithymic characteristics, feelings and fantasies are not experienced, but are expressed somatically, and eventually, in some, in psychosomatic illness. Others have suggested an etiological explanation which challenges Alexander's (Alexander, French, & Pollack, 1968) traditional etiological theory of psychosomatic disease. To be brief, simply stated, Alexandrian theory suggested that unconscious psychological conflicts led to emotional stresses. These remained unexpressed, due to powerful defense mechanisms, and thus, were channelled through physical pathways, with heightened autonomic arousal ultimately resulting in psychosomatic disease.

Some theorists, attempting to explain the etiology of alexithymia (e.g., Sifneos, Apfel-Savitz, & Frankel, 1977), have suggested a very different direction of causality. They believe that individuals exhibiting alexithymic characteristics suffer a specific deficit. It is "the very existence of the alexithymic defects which is responsible for the appearance of the internalized conflicts" (Sifneos et al., 1977, p. 53).

This deficit, consisting, in part, of a lack of awareness and expression of feelings, causes such individuals to be threatened in interpersonal situations. They are bewildered in these situations and find themselves in a progressively helpless position. In an attempt to cope they exhibit other characteristics of alexithymia (e.g., endless descriptions of the details of the environment and daily life; action to resolve conflict). This inadequate response leads to further tension and helplessness, which mobilizes the autonomic and endocrine systems, eventually giving rise to increased somatic complaints or psychosomatic illness. So, instead of unconscious emotional conflicts leading to psychosomatic problems, these researchers propose that a lack of affective and fantasy processes (alexithymia) leads to stress, somatic complaints, and, in some, eventually to psychosomatic illness. Flannery (1977, 1978) has suggested that indeed the common link among the many groups that appear, at least to some extent, to manifest alexithymic features, is the somatic complaints and puzzling somatic preoccupations which these patients often report. In other words, alexithymia is correlated with, or results in, an inability to verbalize feelings coupled with somatizing in these individuals.

Some researchers have hypothesized that such verbal deficits in alexithymic individuals are merely an expression of social factors, such as socioeconomic status (SES) or intelligence. Shands (1975, 1976), most notably, has suggested that the cluster of characteristics known as alexithymia resembles the cognitive functioning of peoples in preliterate societies. Several authors (e.g., Cremerius, 1977), indicating that lower SES individuals show increased alexithymia, have concluded that alexithymia "occurs more or less exclusively in patients of lower social class . . . (it) is not a psychosomatic phenomenon but a social one" (p. 198). However, no objective measures of either alexithymia or SES appear to have been used in these studies and, when such measures are used, alexithymia does not appear to be solely an artifact of SES (Doody & Taylor, 1983; Gardos et al., 1984; Mendelson, 1982; Pierloot & Vinck, 1977).

Some investigators have made a similar claim for intelligence, that is, they have suggested that alexithymia is an artifact of lower IQ and education. Again however, this was generally only the case when objective measures of IQ or education were not used and estimates of these were made by impressionistic means (Borens et al., 1977; Pierloot & Vinck, 1977; Schneider, 1977). The hypothesized relationship between alexithymia and IQ and education did not hold up to empirical investigation with the use of more objective measures of IQ (Cohen, Auld, Demers-Desrosiers, & Catchlove, 1985) and education (Doody & Taylor, 1983, Gardos et al., 1984; Smith, 1983). Alexithymia then, does not appear to be restricted to those with lower SES, IQ, or education.

In addition, it is not restricted to those with somatic disorders. Investigators have also found alexithymic characteristics in patients manifesting various forms of psychopathology. These include: those who have been severely traumatized (e.g., Krystal, 1968; 1979), who have substance abuse disorders (e.g., Krystal, 1979; Krystal & Raskin, 1970; Wurmser, 1974), and who have been diagnosed as having psychopathic (e.g., Keltikangas-Jarvinen, 1982), compulsive (e.g., Gardos et al., 1984), borderline, or narcissistic disorders (e.g., Gardos et al., 1984; Keltikangas-Jarvinen, 1982; Krystal, 1979).

Whereas alexithymia may be found in patients with some forms of psychopathology, it also appears to be independent of many previously identified and studied personality and psychopathological characteristics. For instance, clinicians view alexithymic characteristics as quite distinct from neurotic characteristics. Schneider (1977) stated that the alexithymic "structure hinders the creation of 'romance' that is characteristic of the neurotic or genital transfer relationship" (p. 37). Indeed, alexithymic characteristics appear to be in sharp contrast to neurotic functioning, which involves a rich inner life with fantasies and affective expressiveness (Nemiah, 1978). Patients considered alexithymic typically score lower than those considered

nonalexithymic on various measures of neuroticism (Fava, Baldaro, & Osti, 1980; Lolas, von Rad & Scheibler, 1981; Mendelson, 1982).

In addition, there are generally a lack of significant differences between alexithymic and nonalexithymic groups on a number of other measures of psychopathology. Alexithymia does not appear to correlate with measures of anxiety (Blanchard, Arena, & Pallmeyer, 1981; Mendelson, 1982), depression (Blanchard et al., 1981; Lolas 1981; Mendelson, 1982), or hostility (Mendelson, 1982).

Although correlated with some forms of psychopathology and independent of a number of other psychological attributes, alexithymia may also exist as a normal variant in the general population (Blanchard et al., 1981). Some researchers have suggested that it exists in the general population and can be evinced in anyone under the appropriate circumstances (Brutigam & von Rad, 1977; M. Singer, 1977). Shipko (1982b) even proposed that, if debilitating somatization is not present, alexithymia may serve a useful function in normal populations, namely, the facilitation of task-oriented behaviours over a long time period and without distraction.

The percentage of a normal population scoring alexithymic has varied across studies, due, at least in part, to the different measurement techniques used. Blanchard et al. (1981) have provided evidence for alexithymic characteristics in nonclinical populations. In a sample of university students, approximately 6 %, 8.2 % of males and 1.8 % of females, fell within the alexithymic range. These researchers used a self-report scale, the Schalling-Sifneos Personality Scale (Apfel-Savitz & Sifneos, 1979), to measure alexithymia. Using the MMPI alexithymia scale (Kleiger & Kinsman, 1980) Cooper and Holmstrom (1984) found alexithymic characteristics in a normal sample. Others (e.g., Heiberg, 1980), using a different self-report measure, the Beth-Israel Psychosomatic Questionnaire (Sifneos, 1973), have also found subjects in normal samples to exhibit alexithymic characteristics. Cohen (personal communication,

January, 1987) indicated that in a sample of university students up to 20 % scored in the alexithymic range, using a projective test, the Scored Archetypal Test with 9 Elements. Using the same test, the author found that 26 % of a university student sample scored in the alexithymic range. Thus, alexithymic characteristics can be found in many populations, using different measurement techniques. (More information about the various measurement techniques used in the assessment of alexithymia is provided below.)

Whereas Flannery (1977) stated that alexithymia is an all-or-none phenomenon, most observers concur that it is manifest in varying degrees along a continuum (e.g., Heiberg, 1980; Kimball, 1977; Lolas et al., 1980; Wolff, 1977a). If alexithymia is indeed a psychological attribute occurring along a continuum, it may be a measureable, quantitative construct existing, to some degree, in all individuals. As Lolas et al. (1980) stated, "this generality of alexithymia characteristics, while lessening their diagnostic specificity, converts them into basic psychological dimensions" (p. 139). There is evidence that alexithymia is not just a new term for some previously known psychological trait. Alexithymia appears to be, as Sifneos (1973) contends, a newly measured psychological attribute.

Alexithymic traits appear to be present in varying degrees in many individuals. Alexithymia appears to be found particularly in those with psychosomatic disorders or somatic complaints. It is generally seen as a trait cluster, a personality, or psychological attribute, which can be understood as a cognitive style dimension. Empirical attempts to measure this multitrait construct were initially few and inadequate, but researchers have made recent advances in this area, a description of which now follows.

Empirical Evidence

In the search for empirical evidence of alexithymia investigators have attempted to go beyond clinical observation and measure the construct in a valid and reliable manner. Whereas alexithymia is a multitrait construct, researchers have had difficulty operationalizing the construct through the development of a global measure which adequately taps all of its components. In particular, many global measures have failed to assess the aspect of alexithymia related to deficits in fantasy processes. Researchers have also made attempts to assess the components of alexithymia separately. For example, investigators have typically assessed fantasy processes with various projective techniques. The measurement techniques they have employed as global measures of alexithymia have included observer-rated and self-assessment questionnaires.

The Beth-Israel Psychosomatic Questionnaire (BIQ) (Sifneos, 1973) is interviewer-rated with only eight dichotomously scored items pertaining to alexithymia. One study (Gardos et al., 1984), which examined the factor structure of the BIQ, found a four factor solution congruent with the alexithymia construct, and moderate internal consistency coefficients for the two primary factors indicating the items cluster together and thus the construct is at least somewhat homogeneous. However, whereas some researchers have found good interrater reliability for the BIQ (Apfel-Savitz & Sifneos, 1979; Kleiger & Jones, 1980; Paulson, 1985), others have reported a myriad of problems, having found scoring to be dependent upon interviewer experience, bias and style (Lolas et al., 1980; Lolas & von Rad, 1982; Schneider, 1977; Taylor et al., 1981; Wolff, 1977b). This calls into question the validity of the BIQ.

In addition to problems with validity, the two primary and psychometrically sound BIQ factors reflected difficulties in handling emotions and problems in verbal and nonverbal communications. The BIQ does not seem to capture a major component of alexithymia, namely, that related to fantasy processes. Perhaps it is inappropriate to expect such a brief scale to capture the full breadth of the alexithymia construct.

One self-report measure, the MMPI alexithymia scale developed by Kleiger and Kinsman (1980), although widely used, has questionable validity. Bagby, Taylor and Ryan (1986a) have reported on improper item selection during the test's development. Also, it appears to lack both face validity (Kleiger & Kinsman, 1980; Taylor, 1984) and construct validity (Doody & Taylor, 1983; Demers-Desrosiers et al., 1983; Federman & Mohs, 1984). It seems to fail to capture two important features central to the alexithymia construct, that is, reduced emotional expressiveness and deficits in fantasy processes. Rather, it may be measuring defensiveness and social conformity. Again there is a failure to capture the breadth of the alexithymia construct, and in particular, the component related to fantasy processes.

A second self-report measure is the Schalling-Sifneos Personality Scale (SSPS) (Apfel-Savitz & Sifneos, 1979), with each of 20 items rated on a one to four scale and a score of 50 or below indicating alexithymia (Blanchard et al., 1981). The SSPS has demonstrated adequate reliability (Shipko & Novello, 1984) and there is evidence for divergent and convergent validity (Blanchard et al., 1981). However, the authors of the scale (Apfel-Savitz & Sifneos, 1979) stated that in their research with it "the results are erratic . . . and do not correlate with the BIQ" (p. 184). Factor analytic studies have indicated that this measure has an unstable factor structure, with less than half the items loading on any one of the retained factors (Bagby, et al., 1986a; Blanchard et al., 1981; Martin, Pihl, & Dobkin, 1984; Shipko & Novello, 1984). The nine items with significant correlations are unlikely to sample the construct domain of alexithymia adequately or proportionately. For example, the Daydreaming and Introspection factor was represented by only two items which may belie its importance for the alexithymia construct. Based on the results of a psychometric study, Bagby et al. (1986a), stated that their research "indicate(s) that the SSPS . . . cannot be recommended for clinical or research purposes" (p. 287). Also, in a validity study of alexithymia measures, Paulson (1985) found no evidence "to

recommend the use of the MMPI Alexithymia Scale or the Schalling-Sifneos Scale as acceptable research instruments" (p. 57).

A newer, self-report measure of alexithymia, the Toronto Alexithymia Scale (Taylor et al., 1985), has been developed following standard methods of test development. The psychometric properties of the scale are quite adequate. Further information on these is provided in Chapter III. The Toronto Alexithymia Scale is based on a four-factor model of alexithymia. The four factors identified are: (1) Difficulty Identifying and Distinguishing Between Feelings and Bodily Sensations, (2) Difficulty Communicating Feelings, (3) Reduced Daydreaming, and (4) Externally Oriented Thinking. These factors are congruent with the clinical description of the alexithymia construct. Also, they appear to capture the breadth of the alexithymia construct better than other global measures.

As indicated, in their attempts to measure only the component of alexithymia related to fantasy processes, researchers have focused their efforts around the use of various projective techniques. These include a new, promising measure, the Scored Archetypal Test with 9 Elements (SAT9) and more traditional measures such as the Sentence Completion Test (SCT).

Few investigators have used the SCT to assess alexithymic characteristics. Lesser et al. (1979) did not find significant differences between a mixed psychosomatic and a mixed psychiatric outpatient population on SCT-derived measures.

A few investigators have used the Thematic Apperception Test (TAT) to assess alexithymic characteristics. By examining verbal behaviours in TAT story production, these investigators addressed the observation that those exhibiting alexithymic characteristics cannot express their feelings verbally. Taylor and Doody (1982) compared inflammatory bowel disease patients with psychoneurotics, finding that the bowel patients had shorter TAT stories than the psychoneurotics. In an additional study by Taylor et al. (1981), the inflammatory bowel disease

group was similarly less productive verbally in their TAT stories. However, another study by von Rad et al. (1977) did not find significant differences in TAT production between psychosomatic and psychoneurotic patients as measured by overall word quantity. Defourny, Hubin and Luminet (1977) claimed to have found alexithymic characteristics in Type A coronary prone subjects using the TAT. Using a probability level of .10, they stated that Type A subjects produced significantly shorter stories on the TAT than Type B subjects. They also suggested that there were some qualitative differences between these two groups on the TAT stories, with Type As showing a certain poverty in the realm of fantasy. Also, the stories of Type A subjects impressed the investigators as more "chaotic," and although both groups exhibited themes of "ambition," Type A subjects were said to have coupled ambition with "dysphoria." However, these investigators implicitly assumed that psychosomatic patients are alexithymic without employing any independent test for alexithymia.

A number of investigators have incorporated the Rorschach Projective Test as one of several measures used to assess various components of alexithymia. In the studies by Taylor et al. (1981) and Taylor and Doody (1982), comparing psychoneurotic and inflammatory bowel disease patients, the latter group's Rorschach scores indicated they were not as capable of modulating their emotions (fewer Form Colour responses). On a Rorschach measure of fantasy production, that is, Human Movement, there was no difference between the two groups. By way of comparison, Vogt, Burckstummer, Ernst, Meyer and von Rad (1977), assessing psychosomatic and psychoneurotic groups, did find significant differences in fantasy production on a number of Rorschach measures, with the psychosomatic patients showing a decreased fantasy life. An additional study (Safar, Kamieniecka, Levenson, Dimitriu, & Pauleau, 1978) compared nonclinical subjects and sustained and borderline hypertension patients. The sustained hypertensives manifested, relative to the other two groups, reduced fantasy formation and an

inability to express anxiety through the use of fantasy, as assessed by Human Movement scores on the Rorschach. The borderline hypertensives were reported to have displayed reduced fantasy production in comparison to the control group.

There are concerns regarding the Rorschach research presented. In addition to long-standing concerns regarding the reliability and validity of the Rorschach, these investigators generally do not appear to have examined closely the pattern of Rorschach indices, including various ratios and more complex indicators, such as coping style. Thus, much of the information accrued from this measure appears to be lost.

The SAT9 (Scored Archetypal Test with 9 Elements (scored AT9)) is a relatively new and promising instrument now used for assessing alexithymia, or more correctly, one of its central components, namely fantasy. The SAT9 is a self-administered grapho-analysis test, whose scoring system provides a quantitative measure of fantasy. The authors of the test (Demers-Desrosiers et al., 1983) stated that the SAT9 "allows one to discriminate between forms and degrees of disorganization in symbolic activity within an alexithymic population" (p. 65). It "is a test of symbolic function which attempts to measure subject's capacity for fantasy" (Cohen, 1985, p. 1). Unlike some other measures which are pluridimensional (e.g., BIQ), and thus, supposedly screen for all traits considered to constitute alexithymia, the SAT9 has a unidimensional focus, measuring one of its primary elements, that is, fantasy.

Demers-Desrosiers (1982) carried out the first attempt to assess alexithymia using this test. Subjects in the Demers-Desrosiers (1982) study consisted of a heterogeneous psychosomatic group. They were reported to have displayed decreased fantasy ability on the Archetypal Test with 9 Elements in proportion to their alexithymia score as assessed by the BIQ. The author suggested that Freyberger's (1977) distinction between primary and secondary alexithymia may be supported by these results. She indicated that the most alexithymic subjects produced "comic-

strip"-like drawings and exhibited the most severe fantasy deficit, which could perhaps be considered primary alexithymia.

Demers-Desrosiers (1982) carried out this early attempt to employ the Archetypal Test with 9 Elements before the scoring system was devised. Because no scoring system had yet been devised for the test, the results of this study were reported in a qualitative and descriptive fashion. Originally, the Archetypal Test with 9 Elements was created by Y. Durand (1971), based on the work of G. Durand (1969), and used to test the psychoanalytic concept (Krystal, 1982; Marty & de M'Uzan, 1963; Vogt et al., 1977) that psychosomatic symptoms result from an absence of capacity to fantasize and express feelings. Further use of the test in the study of alexithymia was impeded by heavy reliance on researchers' knowledge of G. Durand's (1969) theory of the structure of the imagination in scoring the projective protocols. (For a more thorough review of the theoretical basis of the Archetypal Test with 9 Elements, refer to G. Durand, 1969, and Y. Durand, 1970.) Cohen et al. (1983) overcame this problem by developing the scoring system for the Archetypal Test with 9 Elements using a homogeneous population of chronic pain patients.

The interrater reliability coefficients for the Scored Archetypal Test with 9 Elements (SAT9) have been found to be robust. A further validation study (Demers-Desrosiers et al., 1983) of the SAT9, also using chronic pain patients, found a significant correlation between SAT9 and BIQ scores, but not between SAT9 and MMPI alexithymia scale scores. There is also evidence for the discriminant (Catchlove, Cohen, Braha, & Demers-Desrosiers, 1985) and construct (Cohen, Auld, Demers, & Catchlove, 1985) validity of the measure.

Although further development of the SAT9 continues, it has been shown to possess good reliability and validity, especially when compared to most projective tests. This measure appears to adequately assess a fantasy deficit.

As a multitrait construct, alexithymia involves deficits in a number of allied processes. Researchers have had difficulty assessing this collective construct with global measures, due to the constructs breadth and diversity, among other factors. Development of recent tests, such as the Toronto Alexithymia scale, has shown advances in this area and has employed standard psychometric procedures in test development. An important new measure of one component of the alexithymia construct, the SAT9, assesses fantasy deficits. Previous researchers have not determined whether the alexithymic deficit in fantasy processes is more encompassing. For example, it was not known if there were concurrent deficits in imagery formation. Thus, one of the purposes of the present research was to explore the relationship between the various components of the alexithymia construct and imagery. Another purpose was to ascertain the relationship between fantasy deficits, imagery deficits (if any), and the alexithymia construct as a whole. With a clearer picture, empirically drawn, outlining the dimensions of the proposed alexithymia deficits, and the relationship between the various components, the alexithymia construct was further explored in the present research. A further purpose of the present work was to examine the relationship between the alexithymia construct and cognitive style. Researchers have proposed etiological theories of alexithymia related to cognitive style.

Neurological Model of Alexithymia

Investigators have proposed a number of etiological theories of alexithymia. (See the very comprehensive theoretical article by Nemiah (1977).) These theories have ranged from the psychodynamic view that alexithymia represents a global defensive structure (e.g., Krystal & Raskin, 1970; Benedetti, 1983) or early ego deficits (e.g., Marty & de M'Uzan, 1963; McDougall, 1974), to the view that it results from neurological impairment. Nemiah (1975,1977) has put

forth one such neurological theory. He has hypothesized that, in those exhibiting alexithymic characteristics, there is a defect in the striatum connecting the limbic system and neocortex which mediate emotional and fantasy functioning, and psychic elaboration, leading to a deficit in affective and cognitive expression. No one has empirically investigated this hypothesis. There has also been little empirical evidence to support psychoanalytic views of the etiology of alexithymia collectively or differentially, as psychoanalytic theorists have not developed cohesive or comprehensive theories specifically related to the etiology of alexithymia to date.

The neurological model of alexithymia which has received most attention is based upon the idea that those psychological functions observed to be impaired in alexithymic individuals are seen as predominantly right-hemisphere processes. Those putting forth this model posit that, in individuals exhibiting alexithymic characteristics, there is either an increased responsiveness of the left hemisphere (in right-handed people), an impairment of function of the right hemisphere, or a disconnection between the two hemispheres (e.g., Gottlieb, 1984). Whichever the case, right-hemisphere processes are believed to be relatively inaccessible to people with alexithymic characteristics.

This model is based on the general literature regarding the lateralization of brain functions. Many studies, using a variety of assessment techniques, have provided support for considerable specialization of the brain's two hemispheres. The evidence from this research suggests that each hemisphere is specialized for different cognitive functions: The left hemisphere (in right-handed people) is involved in an analytic, rational, logical mode in which words are more important, whereas the right hemisphere is mainly nonverbal, functioning in a holistic, gestalt mode and is important in spatial relations, emotions, fantasy and the like (e.g., Doyle, Galin, & Ornstein, 1974; Galin & Ellis, 1975; Galin & Ornstein, 1972; Miller, 1986; Reiser, 1984; Sperry, 1973; Winson, 1985).

It appears then, that the functions observed to be impaired in those displaying alexithymic characteristics tend to be assigned to right-hemisphere processing. These include feelings (e.g., Sackeim, Gur, & Saucy, 1978; Schwartz, Davidson, & Maer, 1975; Smokler & Shevrin, 1979), dreams (e.g., Flannery & Taylor, 1981), fantasy (e.g., J. Singer, 1966), and related processes, such as hypnosis (e.g., Bakan, 1971; Hilgard, 1979).

The reader should note two important points at this juncture. First, an earlier "concept of unilateral dominance of left over right (minor) hemisphere in man has been abandoned and replaced by one of complementary specialization" (Teuber, 1974, p. 71). Thus, the two hemispheres are considered of equal importance with the information processing carried out in each hemisphere being integrated by the corpus callosum.

Second, although this model of alexithymia is based on the theory of lateralization of brain function, there is, at present, considerable controversy over hemispheric specialization models (e.g., Allen, 1983). This is especially true with regard to the lateralization of visual imagery functions. Most researchers in the past have agreed that imagery is a predominantly right-hemisphere process (e.g., Bakan, 1971, 1980; Humphrey & Zangwill, 1951; Ley, 1983). However, some, such as Marks (1986), believe that, although the brain area devoted to imagery on the right side is much larger than any imagery area available on the left, imagery is represented across both hemispheres of the cortex. And Ehrlichman and Barrett (1983), in a review article, cited many authors who appear to assume that imagery functions are located in the right hemisphere, but concluded that the available evidence does not support this assumption. Farah (1984), taking into consideration the complexity of imagery processes, proposed that various components of imagery functioning (e.g., long term visual memory, visual buffer, generation and inspection processes) have different physiological bases. In other words, some imagery subsystems may be located in the left hemisphere, whereas others may be found in the right hemisphere. Her 1984 article provided some evidence for this.

Clearly, the processes said to be impaired in people exhibiting alexithymic characteristics, including imagery, are very complex functions and thus, probably require some processing in both hemispheres. Therefore, it is important to realize it is not being suggested here that psychological functions are assigned exclusively to each of the two hemispheres. Rather, there is a relative predominance of one hemisphere or the other, depending on the individual and the stimuli or information being processed (Galin, 1976). As Miller (1987) stated recently, "the right hemisphere has more of a special role to play than the left in emotion and intuition Both hemispheres contribute to different aspects of emotional experience and expression, but the right brain does seem more necessary than the left for making intuitive inferences as opposed to analytic judgements" (p. 6).

Investigators have often conceptualized the postulated differences in information processing based on hemispheric laterality within the framework of a cognitive style dimension. Bogen (1969) used the term hemisphericity to refer to the tendency for an individual to show greater reliance on either the left or right hemisphere in his or her overall psychological functioning. Austin (1971) referred to convergent thinkers (who excel at rational analysis) and divergent thinkers (who exhibit "mental fluency" and imaginativeness). Bogen and Gazzaniga (1965) designated two comparable modes of thought as propositional (left hemisphere, verbal) and appositional (right hemisphere, visuospatial). Galin (1974) suggested that certain aspects of right-hemisphere functioning is comparable to what Freud termed primary process thinking, whereas left-hemisphere processes would correlate with secondary process thinking. Some cognitive information processing theorists, in particular, those studying mental imagery, have suggested a similar categorization of cognitive processes. For example, Zenhausern (1978) suggested a left-hemisphere, verbal, and a right-hemisphere, visual imagery, specialization.

Developmental theorists also provide support for such a distinction between two major modes of processing information. In addition to Freud's reference to primary and secondary processes, he also stated in "The Ego and the Id" (1927/1957) that "thinking in pictures . . . approximates more closely to unconscious processes than does thinking in words, and it is unquestionably older than the latter both ontogenetically and phylogenetically" (p. 23). (For a thorough review of the possible rapprochement between neurobiology and psychodynamic psychology see Miller (1986), Reiser (1984), and Winson (1985) and, Flannery and Taylor (1981) for an emphasis on psychosomatic issues, including alexithymia).

Piaget (Piaget & Inhelder, 1966/1971), in the book, "Mental Imagery in the Child," viewed images as being based upon internalized imitation of objects and actions. Two decisive moments were observed in the evolution of imagery ability. Imagery initially appears in static form only, at the same time as the formation of other fantasy-like processes (one and one-half to two years). Then, at the operational level (seven to eight years) the child develops the ability to transform these internal images. According to Piaget, this development parallels the child's acquisition of verbal and analytic skills. Thus, again theorists make a distinction between verbal and imagery processes, each of which complements the other in normal cognitive functioning.

In brief, although one would be unwarranted in concluding that the brain is neatly compartmentalized, there is a general body of theory and research support for a degree of hemispheric specialization of function. Researchers describe the left hemisphere as being activated by a group of activities involving verbal, rational, and analytic functions, whereas the right hemisphere is described as being activated by a group of functions involving feelings and processes such as fantasy, and possibly, some aspects of imagery functioning. Thus, right-hemisphere functions appear, in general, to involve processes that are thought to be impaired in individuals manifesting alexithymic characteristics. Investigators have suggested that individuals

have a preferential cognitive style which shows greater reliance on one hemisphere or the other in his or her overall psychological functioning. Those judged to be alexithymic thus, may be exhibiting a neurologically grounded cognitive style.

Seen within this framework, people exhibiting pronounced alexithymic characteristics may be operating at the extreme of a continuum, whereby right-hemisphere processes are unavailable, at least for conscious use, due to a structural or functional impairment, and left-hemisphere processes are thus relied upon inordinately. A number of researchers in the field of neurophysiology have noted an apparent difference in cognitive style between individuals judged to be alexithymic and those judged to be nonalexithymic and have conducted research in an attempt to directly connect alexithymia with neurological deficits.

Evidence from the research presented below includes observed similarities in cognitive style and affective expression between individuals with alexithymic characteristics and those with surgically, accidentally, and naturally caused neurological lesions. The author has also presented below EEG studies of hemispheric function and sleep behaviour.

Hoppe (1977) and Hoppe and Bogen (1977) conducted research with epileptics with dysgenesis of the corpus callosum due to having been commissurotomized. They noted similarities between these patients and the characteristics described in those considered alexithymic. As a consequence, Hoppe hypothesized a physical (structural) or functional (defense mechanism) disconnection between the two cerebral hemispheres to explain alexithymic characteristics. According to this theory, with the left hemisphere disengaged from right hemisphere affective and fantasy processes, it communicates with the exaggerated, thing-rather-than-feeling emphasis of the alexithymic, whereas the right hemisphere, without a verbal outlet, hypercathects somatic sensations (Gottlieb, 1984; Lesser, 1981).

TenHouten, Hoppe, Bogen, and Walter (1985a, b, c, d) recently published a series of articles in which they reported the results from a number of measures which they developed to assess alexithymic characteristics in eight commissurotomy patients and eight normal, matched controls. Commissurotomy patients had significantly higher mean scores (greater degree of alexithymia) on seven of 16 indicators than did controls. Of two "fantasy" and four "symbolization" variables, the commissurotomy patients were significantly more alexithymic on the three symbolization variables called quality, capacity, and structure of symbolization. The structure of symbolization associated with increased alexithymia emphasized a discursive style reflecting logic and secondary process thinking in contrast to being focused on feelings. The capacity for symbolization associated with alexithymia reflected use of concrete and descriptive detail versus "creative activity." The quality of symbolization emphasized rigid, concrete, stereotyped denotations (alexithymia) "as opposed to being flexible and rich in symbols, images, ideas and connotations" (TenHouten et al., 1985c, p. 91). The authors interpreted their findings as lending support to the hypothesis that alexithymia is a split brain syndrome with right brain activity unable to reach awareness or expression.

Complementing Hoppe and Bogen's work, Buchanan, Waterhouse and West (1980) presented a single case study of a male patient with agenesis of the corpus callosum. This patient displayed severe alexithymic characteristics and reported an inability to dream, but apparently had normal periods of REM sleep. Earlier research (Humphrey & Zangwill, 1951), reinterpreted within the context of the alexithymia construct (Flannery & Taylor, 1981), has reported a number of cases with damage to the right hemisphere in which imagery deficits were specifically mentioned. These patients experienced a cessation or depression of dreaming and waking visual imagery.

Buchanan et al. (1980) also pointed out similarities between those exhibiting alexithymic characteristics and patients with neuroanatomical lesions of the right hemisphere due to trauma. Patients with aprosodias, disorders of affective language resulting from focal lesions of the right hemisphere, exhibited both aprosodia and alexithymia and reported an inability to dream (Fricchione & Howanitz, 1985).

In addition to the study of patients with neurological lesions, investigators have used measures of EEG to examine the relationship between neurological activity and the lack of dreams reportedly found in those exhibiting alexithymic characteristics. In a series of studies with eczema patients Brown and his cohorts (Brown, 1967; Brown & Betley, 1971) identified a group of "super-stable" patients who possess characteristics similar to those often now called alexithymic. In a pilot study, Brown and Kalucy (1975) investigated a small group of these patients with alexithymic characteristics and found greatly reduced slow wave sleep and few or no reported dreams following long periods of REM sleep (Kalucy, Brown, Hartman, & Crisp, 1976).

In a further pilot study by Tantom, Kalucy, and Brown (1982), alexithymia patients with skin disorders showed a trend toward less REM sleep than controls. The experimental group was also reported to have shown a "significant lack of involvement" in the dreams they described.

Two other investigations supplement the neurological, and sleep or dream studies of alexithymia. The first study, by Cole and Bakan (1985), used conjugate lateral eye movements (CLEMs) as an index of hemispheric activity and investigated the relationship between CLEMs and alexithymia. The direction of initial eye movements in response to test questions is hypothesized to indicate the relatively greater activation of the contralateral hemisphere. The Cole and Bakan study found the opposite to what would be expected if alexithymia is a right-hemisphere processing deficit. That is, alexithymic characteristics and right-hemisphere

activation showed a small, positive, and significant correlation for total sample (four percent of variance) and female sample (12 % of variance). However, this study used a nonclinical sample and the Schalling-Sifneos Personality Scale measure of alexithymia, which has since been found to be psychometrically unsound and which is thus, not recommended for clinical or research purposes (Bagby et al., 1986).

In a second study, Kaplan and Wogan (1976) replicated Spanos, Barber and Lang's (1974) experiment and again found that the experience of experimentally induced pain was less in normal subjects in an "instruction to fantasize" condition (right-hemisphere activation, measured by EEG) than in the same subjects with left-hemisphere arousal. Analogously, people exhibiting alexithymic characteristics may experience more painful somatic symptoms due to a lack of right-hemisphere processing of painful stimulation, and a resulting predominance of left-hemisphere activation (i.e., excessive verbalization, etc.). In their report of this experimental analogue of alexithymia Kaplan and Wogan (1976) stated that the "uninstructed subjects, lacking a stable visualization, utilize a left-hemisphere, verbal mode to cope with the pain" (p. 144). In comparison, the subjects instructed to fantasize experienced a ceiling on pain sensation which appeared to be established through fantasy by visualization. The authors stated that these subjects "reassemble (the instructions') meaning into appropriate visual imagery" (p. 151). Some subjects who gave low pain ratings did report getting an image clearly in mind and keeping it there, thus appearing to block out the experience of painful stimuli.

In summary, there is increasing evidence that there is either a relative unavailability of right-hemisphere mediated processes to the alexithymic's conscious functioning or a lack of the occurrence of such processes. The result, in either case, appears to be a deficit in psychological functioning in which individuals exhibiting alexithymic characteristics display a highly limited introspective capacity and less evidence of feelings and processes such as fantasy, at least in

accessible form. Based on a continuum model of cognitive style, individuals displaying alexithymic characteristics appear to operate nearer one end of a cognitive style dimension. However, the author is not aware of any previous empirical investigations of overall cognitive style in those judged to be exhibiting alexithymic characteristics. Further research is needed regarding the relationship between alexithymia and cognitive style. Also, although a number of studies appear to implicate imagery problems as part of the alexithymia construct, and several authors (e.g., Kaplan & Wogan, 1976) have explicitly stated that alexithymic individuals manifest imagery deficits, there is little known regarding the extent to which imagery processes are impaired in those exhibiting alexithymic characteristics.

Imagery and Alexithymia

Whereas some psychologists do not give mental imagery a central role in cognitive processes (e.g., Pylyshyn, 1984), many others see it as a distinct cognitive representational mode (e.g., Kosslyn, 1980; Gardner, 1985). Although imagery is a pervasive form of subjective experience, a general consensus as to a definition is hard to come by (Richardson, 1969). For the purposes of the present study, the author defined imagery simply as a centrally aroused sensation. "It is an element of centrally excited experience which possesses all the attributes of sensation. Thus, the image phenomenon extends from perception of an external object to its mental reproduction, or imaginative reconstruction, with a degree of sensory realism" (Ahsen, 1982, p. 171).

It appears that imagery is important in the psychological processes thought to be deficient in those exhibiting alexithymic characteristics. These include fantasy, day and nightdreams, empathy, hypnotizability, creativity, imagination and affective processes. Imagery is employed in some central capacity in these processes and a brief review of this follows.

It is clear that, in a general sense, imagery plays an integral part in most normal individuals' ongoing stream of consciousness where much of the waking time is spent carrying on fairly complex processing of imagery sequences (J. Singer, 1974). More specifically, imagery plays a central role in fantasy processes (Klinger, 1971; Sheikh & Panagiotou, 1975). For example, Jerome Singer (1966, 1974, 1975) found that visual imagery is the predominant modality for experiencing fantasy and that the functioning of fantasy is not influenced in any significant way by intelligence or socioeconomic background.

Also, the important role of imagery in night dreams has long been suggested through intuitive and clinical evidence (Freud, 1953/1955) and supported by recent empirical research (Martinetti, 1985; Richardson, 1979). Similarly, daydreaming employs a substantial imagery content (Ramonh, 1985; J. Singer, 1975)

Imagery ability is significantly correlated with the ability to empathize with others (Rabinowitz & Heinhorn, 1985). As well, imagery is related to hypnotizability (J. Singer, 1971), with Horowitz (1983) producing enhanced image formation under hypnosis. Absorption, a phenomenon related to hypnosis, is defined as the capacity for attention in an imaginative activity. Ramonh (1985) found absorption to be positively correlated with vivid imagery. Researchers have also indicated that creativity and imagination are positively correlated with the ability to form images (Kaufmann, 1985; Khatena, 1975). "Imagery is linked strongly to the originality and flexibility aspects of creative thinking" (Shaw & DeMers, 1986, p. 65).

Research on mental imagery and affect (reviewed in Lang, 1979) has strongly supported the contention that there is a connection between imagery and affect, especially through the effect each has on visceral responding. That is, both can arouse a somatic response (Ahsen, 1982, 1984; Lang, Kozak, Miller, Levin, & McLean, 1980). The sensory-based nature of imagery material endows it with a special ability to express an immediate quality and degree of emotion. Imagery

experience appears to be more closely connected to the affect system than verbal experience (Jordan & Lenington, 1979; J. Singer, 1974). Thus, imagery can be used purposefully in psychotherapy (e.g., Dosamantes-Alperson, 1983).

Indeed, imagery plays an important explicit role in many of the newer therapies, such as systematic desensitization, gestalt, neurolinguistic programming and the cognitive behaviour therapies. Clinicians have found imagery to be an important therapeutic tool in helping psychotherapy patients get in touch with emotional experiences and learn, for example, through covert rehearsal, new behaviours (M. Anderson, 1980; Cautela, 1977; Korn, 1983; Mowrer, 1977). As well, some oncology physicians have suggested imagery as an explicit tool to assist in the enhancement of immune functioning in the fight against certain diseases, such as cancer (Locke & Colligan, 1986; Ornstein & Sobel, 1987).

It is interesting to consider such issues in regards to the treatment of patients who also manifest alexithymic characteristics. Although some clinicians have suggested that psychoanalytic therapy can be beneficially employed with such people if modifications in technique are made (Krystal, 1979, 1982, 1983), others have stated that traditional psychodynamic psychotherapy is contraindicated for those with alexithymic characteristics (Sifneos, 1974) and that these people do not respond to any "form of treatment which employs verbal expression and requires a capacity for emotional interaction" (Sifneos, 1973, p. 26). There is generally a lack of research relating alexithymia to treatment variables. It is not known whether some of the newer therapies, which rely less on insight and affective expression, might be more efficacious for these people. Considering the frequent failure of traditional therapies with psychosomatic patients and those with alexithymic characteristics, the newer therapies will no doubt be increasingly employed in an attempt to treat these individuals. Indeed, some individuals, working within the area of alexithymia research, have already recommended that, in

addition to looking after the physical needs of the psychosomatic patient with alexithymic characteristics, use be made of "psychological therapies such as relaxation exercises, biofeedback training, and imagery techniques" (Catchlove et al., 1985, p. 248). Because these therapies make frequent use of imagery, it is important to know if people with alexithymic characteristics do possess this capacity, or whether any deficits extend to include abilities in the area of image formation. Presently, there are, at one and the same time, researchers advocating the therapeutic use of imagery techniques with those with alexithymic characteristics and others declaring that such people do not possess the capacity for mental imagery.

In summary, then, there is a cluster of psychological functions which appear to be deficient or less available to individuals with alexithymic characteristics and imagery appears to be involved in some important way with each of these functions. The apparent involvement of imagery in all of these processes may represent a common underlying link among them. The importance of imagery across these various functions suggests that imagery deficits may play an important role in alexithymia and that those manifesting alexithymic characteristics would exhibit imagery deficits. However, various researchers, which the author has presented above, have spoken of imagery in rather global terms, as if it is a unidimensional construct. As is clear from the literature covered here, researchers connecting alexithymia with imagery deficits have shown no apparent awareness of the multidimensionality of imagery phenomenon in their publications. It is important to recognize that any imagery deficits which those manifesting alexithymic characteristics evidence might relate to particular aspects of imagery functioning. Some of those aspects often considered relevant in imagery research protocols include differential vividness across sense modalities, representational processes and spontaneity (Tower, 1981).

Sense modality refers to the ability to image in different sense modalities such as visual and auditory. Some theorists believe that individuals have a preferential imagery sense modality

or possess the ability to image more vividly in one modality as opposed to others (Grinder & Bandler, 1976).

Spontaneity refers to a passive, unintentional, involuntary imagery versus active, volitional, directed imagery. For example, some individuals may not be able to engage in directed imagery but may experience a great deal of spontaneity in imagery production. Furthermore, there is evidence to suggest that individuals differ in the typical emotional tone of their spontaneous imagery (J. Singer & Antrobus, 1966). Such spontaneous imagery is usually associated with daydreaming processes as they are found to occur in the ongoing stream of consciousness in everyday mental activity.

Although most researchers (e.g., J. Anderson, 1978; Pavio, 1971) have recognized the existence of two or three cognitive representational processes, one of which is imagery, some authors have begun to suggest that different processes of representation might be operating within the imaginal process itself. Aylwin (1981) spoke of "verbal, visual and enactive (imagined identification) imagery" (p. 67). The verbal seems similar to what Bruner (1964) called symbolic and Horowitz (1970) called lexical, and appears to involve a verbal, rather than imaginal, coding. However, Aylwin's visual and enactive imagery (previously called kinesthetic by Aylwin (1977)) both appear to refer to two distinct representations within the imaginal mode. The visual is similar to Bruner's iconic and Horowitz's imaginal, whereas the enactive was also labeled such by Horowitz and "learned action pattern" by Bruner. According to Aylwin (1981), enactive imagery consists of imagined identification, and represents an affective perspective with reference to consequences, emotions, personality traits, and intra- and inter-personal interactions.

Cartwright and his colleagues (Cartwright, 1980; Cartwright, Jenkins, Chavez, & Peckar, 1983; Cartwright, Marks, & Durrett, 1978) have proposed that within imagery at least three different representational processes arise. Cartwright referred to these as figural, symbolic, and mimetic and suggested these are cognitive stylistic variables.

Cartwright and his colleagues divided the iconic (Bruner) or imaginal (Horowitz) or visual (Aylwin) representation into two representational processes, the figural and symbolic. The figural image (in visual or other modalities) has a memory-based quasi-perceptual relationship to the object of reference. The process of forming a figural (concrete) image may draw on many memories, thus forming a composite or gestalt of some object or class of objects, a composite instantiation of a referential concept.

The second type of imagery representation process is the symbolic (abstract) in which the image symbolizes an idea. The image has an illustrative relationship to the concept.

The mimetic (personal) imagery representation process is similar to Aylwin's (1981) enactive imagery and has both envisaging and enactive components dealing with emotion and human interaction. This imagery is said to invoke a network of memories linked by relatedness to identifications.

A number of researchers and theoreticians then agree fairly well that there are at least two or three cognitive representational processes of imagery and several other imagery dimensions. Those who have suggested that people exhibiting alexithymic characteristics would be deficient in imagery have spoken of imagery in unidimensional terms. Because of this and because of the fact that the imaging abilities or preferences of people with alexithymic characteristics have not been specifically explored previously, the author found it difficult to make predictions of the exact relationship between imagery and alexithymia. There is little sound empirical reason to suggest that deficits in only some imagery dimensions would be part of the alexithymia construct, whereas other aspects of imagery functioning would be uninvolved in alexithymia. Thus, one might expect alexithymia to be associated with imagery deficits across all dimensions.

As well, based on the clinical presentation of those with alexithymic characteristics, one might expect some imagery dimensions to be related to specific alexithymia components. For

example, the symbolic (abstract) representational imagery process might be related to the reduced daydreaming component of alexithymia. Also, because the mimetic (personal) representational imagery process is said to be related to interpersonal and feeling imagery, one might expect this imagery process to be related to the difficulty communicating feelings component of alexithymia.

Finally the dichotomy between directed imagery and involuntary, spontaneous imagery may be related to alexithymia. Clinical presentation of those with alexithymic characteristics suggest these individuals' ongoing stream of conscious, everyday, mental activity may be more controlled, that is, less spontaneous with respect to fantasy and the like. Their ongoing stream of conscious psychic activity may contain less imagery. Therefore, daydreaming imagery may also be related to the reduced daydreaming component of alexithymia.

Summary and Hypotheses

This was an exploratory study to empirically examine the relationship of alexithymic characteristics to imagery functioning and cognitive style. The author of this study attempted to ascertain whether measures of the alexithymia traits would be correlated with measures of various imagery dimensions.

Based on theory and clinical observations, researchers have stated that alexithymia involves deficits in processes such as fantasy and imagery. The work of Cohen and her colleagues with the SAT9 indicated that fantasy deficits do indeed appear to be involved in alexithymia. The present author attempted to further define alexithymia through an examination of the relationships between the various proposed components of alexithymia. Specifically, he examined together subjects' scores on measures of various imagery and alexithymia traits to explore their relationships and to see which dimensions of imagery are related to which

alexithymia components. This data may be of significant clinical importance by providing information on the usefulness of the psychotherapeutic techniques employing imagery with these individuals. By better empirically defining the nature, scope, and degree of deficits in alexithymic individuals, the author hoped to more clearly outline and define the alexithymia construct. As well, by adding to our understanding of the processes being tapped by some of the tests used to assess alexithymia, the author hoped to better ascertain the validity of these tests.

Central to the thrust of this investigation of imagery deficits in alexithymic individuals is the recognition of different dimensions of imagery and further differentiation within the imagery dimension of representational processes. Consequently, for the first time, the author empirically examined the relationships between alexithymia and the imagery dimensions of sense modality, spontaneity, and the three imagery representational processes, namely, figural, symbolic, and mimetic imagery. In the present study, the author also empirically examined, for the first time, the proposed tendency for those with alexithymic characteristics to employ an overall cognitive style theoretically related to hemispheric laterality.

The author also explored the relationships between a number of pairs of subsidiary variables. Previous researchers have indicated a relationship between alexithymia and psychosomatic or somatic conditions. Thus, in this study, which employed both a clinical and a nonclinical sample (described in detail below), the researcher examined the relationship between alexithymia and group membership. Also, the clinical subjects, who were chronic pain patients, were evaluated with regard to whether their pain was greater than expected based on medical condition. The author also explored the relationship between this pain evaluation and alexithymia.

Finally, the researcher explored the relationship between alexithymia and a number of interpersonal variables. Several other investigators have suggested that those who manifest a

greater degree of alexithymia would have more difficulty in interpersonal relationships. Alexithymia, by definition, involves, among other things, problems in the awareness and expression of feelings. Not surprisingly then, Sifneos et al. (1977) have indicated that alexithymic individuals generally have poor intimate relationships and problems in interpersonal communication. Thus, one might expect that alexithymics would be less likely to be in a committed, intimate, long-term relationship, or to have remained in such a relationship. Therefore, subjects exhibiting more alexithymia may be more often separated, divorced, or to have never married. Such marital status could be the result of avoiding intimate contact, ending it if it did occur, or of spousal dissatisfaction with such an emotionally unexpressive or unavailable partner leading to divorce. Others (McDougall, 1974) have suggested that alexithymic individuals had poor parental relationships in early childhood. If this is the case, it might be reflected in a poor adult relationship with parents. Thus, in this study, the researcher evaluated the associations of alexithymia to quality of parental relationships, quality of communication and relationship with spouse, and to marital status.

This was an exploratory study with little previous research on alexithymia's relationship with imagery and cognitive style on which to base predictions; so, the researcher found it difficult to make definite predictions related to expected outcome. However, he offered the following hypotheses:

(1) Lack of facility with imagery across several dimensions is positively related to the alexithymia deficits, and thus, measures of imagery and alexithymia load together on one or more factors.

(2) A problem in the integrated use of fantasy is positively related to the alexithymia deficits, and thus, measures of fantasy deficit and alexithymia load on one factor.

(3) Alexithymia is positively related to a cognitive style involving left-hemisphere processes and inversely related to a cognitive style involving right-hemisphere processes.

CHAPTER II

METHOD

Subjects

The researcher wanted a sample of subjects who would be expected to manifest a significant degree of alexithymia. Therefore, he chose to include a clinical group in the study, as well as a nonclinical group. This latter sample was used to give a greater spread of scores than the clinical group alone. Use of the two groups permitted easier access to a larger number of subjects who were expected to exhibit significant alexithymic characteristics, and also permitted a comparison of relationships among the variables between a clinical and a nonclinical sample.

Numerous investigators have claimed that alexithymic characteristics are found in several clinical samples, such as patients with psychosomatic disorders and in those with various somatic complaints. Others have considered chronic pain as a psychosomatic disorder (Blumer & Heilbronn, 1982; Demers-Desrosiers et al., 1983). Researchers, both through clinical and research investigations, have reported alexithymic characteristics in a substantial proportion of chronic pain patients (e.g., Blumer & Heilbronn, 1982; Cohen, et al., 1983; Mendelson, 1982; Rickels, 1981). Consequently the present study employed a chronic pain group as the clinical sample. The author obtained this sample of chronic pain patients from the Gertrude Levin Pain Clinic at Harper-Grace Hospitals in Detroit, Michigan.

The author operationally defined chronic pain as pain of longer than six months duration. Because Catchlove et al. (1985) found that alexithymia was not differentiated by location of pain,

patients with different complaints of chronic pain and varied location of pain were included. However, the researcher excluded from the study: two patients with a known malignant, metastatic, or neurological disease process; two patients who had previously been taught to use imagery as part of a treatment or therapy regimen; and, six patients judged by the pain clinic's clinical pharmacist to be taking CNS stimulants or depressants in quantities that would significantly affect cognitive functioning. The author included in the study the first 64 clinical subjects from the pain clinic who met the selection criteria and who agreed to participate.

The author also included the first 48 nonclinical subjects who met the selection criteria and who volunteered to participate in the study. Because of the importance of tapping a subject pool with a broad spectrum of subject characteristics, the author decided that these subjects should be recruited from a basic community service to which people have universal need and access. Consequently, he obtained these 48 subjects from the general population of adults who were customers of a hair salon.

All clinical and nonclinical subjects in this study were 18 years of age or older. Only subjects who spoke, read and wrote English were eligible for participation in the study.

The author asked subjects to read a covering letter explaining the nature of the study. (See Appendix A.) Clinical subjects who agreed to participate on a voluntary basis, signed a consent form. (See Appendix B.) Voluntary nonclinical subjects signed a similar consent form.

Measures

The researcher, through the covering letter, asked subjects to fill out a questionnaire which included items related to measures of alexithymia and its components, imagery, cognitive style, and demographic and social information. (See Appendix C.)

Alexithymia Measures

(1) Toronto Alexithymia Scale. As the author has indicated, there is some variation in the definition of alexithymia depending on the emphasis of the investigators. For the purposes of this study the operational definition of alexithymia is as defined by the Toronto Alexithymia Scale (Taylor, personal communication, March 13, 1987). Henceforth, this is referred to as the alexithymia scale or variable. The author chose this scale due to its adequate psychometric properties and the fact that it appears to capture the breadth of the alexithymia construct. This is evident in the four factors of the alexithymia scale: (1) Difficulty Identifying and Distinguishing Between Feelings and Bodily Sensations, (2) Difficulty Communicating Feelings, (3) Reduced Daydreaming and, (4) Externally Oriented Thinking. Henceforth, these four subscales of the alexithymia scale are referred to as the (1) body/feelings, (2) communicate feelings, (3) daydream and, (4) concreteness subscales, respectively. Scores can be calculated for each of these four subscales and for the total alexithymia scale. The alexithymia scale contains 26 items, with 11 of these in the body/feelings subscale. The communicate feelings subscale has seven items, the daydream subscale has five items, and the concreteness subscale contains six items. The first two subscales share three items; otherwise there is no item overlap between these scales.

Items for the alexithymia scales were rationally derived. Following is an example of an item from each of these four subscales, in order: "I don't know what's going on inside me." "People tell me to describe my feelings more." "I daydream rarely." "One should look for deeper explanations."

The distribution of alexithymia scale scores is approximately normal. The measure is internally consistent, with an alpha coefficient of .79 and a split-half reliability coefficient of .67. Test-retest reliability, for two different samples, was .82 at one week and .75 at five weeks. There were significant item-factor correlations for all items. The internal consistency and factor

structure have been cross-validated, and thus, the factors are replicable across samples, indicating a stable factor structure.

As anticipated, the alexithymia scale correlated strongly and positively with a measure of hypochondriasis but strongly and negatively with psychological mindedness and with "need for cognition." Bagby, Taylor and Ryan (1986b) found significant, but low, positive, correlations between the alexithymia scale and measures of self-depreciation, social introversion, thought disorder, persecutory ideation, and impulse expression. Although these correlations were significant, they accounted for a small portion of the variance, and thus, these were not thought to represent important relationships. There were no significant correlations with measures of denial, interpersonal problems, alienation, or deviation.

The authors have stated that the alexithymia scale "has minimal response bias and is not unduly influenced by age, education and socioeconomic status" (Taylor et al., 1985, p. 197). Cut-off scores have been established for the alexithymia scale. Scores of 74 or higher are considered to be within the alexithymic range; scores of 62 or lower are considered nonalexithymic (Taylor, personal communication, October 28, 1987).

The alexithymia scale is a self-report measure with self-descriptive items rated on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). One-half of the items are positively keyed and one-half are negatively keyed to control for acquiescent responding.

(2) *Scored Archetypal Test with 9 Elements.* This projective test is available in Demers-Desrosiers (1982). It provides a quantitative measure of the capacity for fantasy. The test is based on G. Durand's (1969) theory of the "anthropological structures of the imaginary." According to this theory, imagination or fantasy serves to reduce anxiety evoked by experiences and problems linked to time and death. The test uses nine symbolic stimuli (e.g., devouring monster, sword) believed to elicit anxiety and to suggest ways in which it can be resolved. Three

mythical infrastructures, the heroic, the mystical and the synthetical, permit the resolution of this anxiety. The subject is asked to integrate the symbols into a drawing and provide a written story based on the drawing. These supply the data upon which the Archetypal Test with 9 Elements (SAT9) is scored.

Subjects whose fantasy ability is inhibited are thought not to be able to integrate the symbols into a drawing or meaningful story, and thus, are unable to acknowledge or resolve conflict and anxiety. A protocol, to be considered normal, must contain one of the three infrastructures, whereas an abnormal protocol may or may not have one. Subjects whose protocols do not contain a mythical infrastructure are more alexithymic and may correspond to Freyberger's (1977) primary alexithymia, whereas some protocols with the infrastructure, although still abnormal, and thus, still alexithymic, may correspond to secondary alexithymia. (For a more complete description of the background of the SAT9 see Demers-Desrosiers, 1982, and Demers-Desrosiers et al., 1983.)

Interrater reliability estimates for the SAT9 are high, .91 for the total sample and total scale (Cohen et al., 1983). The reliability coefficient for the entire scale is reported to be .91, indicating that the scale is highly internally consistent (Cohen et al., 1985). In a small, preliminary sample of subjects, Cohen et al. (1985) found the SAT9 to be related to age, indicating that with increased age comes decreased fantasy ability. In the same sample, they found lower levels of occupational status to be associated with lower levels of fantasy ability. However, in a larger, new sample, these researchers found no significant correlations between the SAT9 and demographic variables.

"The SAT9 provides quantitative information about both the degree and adequacy of integration by measuring the number and nature of interactions between nine symbols" (Cohen, 1985, p. 2) in both the drawing and the explanation. Of the possible number of interactions in

both the drawing and the explanation, 28 in each discriminate between psychosomatic (chronic pain patients) and non-psychosomatic (acute medical patients) at a statistically significant level. Dichotomous scoring (1 for presence of interaction, 0 for absence) is assigned for each of the 28 possible interactions in the drawing, 28 in the explanation, and, if present, how adequately the symbol-interactions are resolved. These 28 triads (or 84 scored items) are arranged into seven clusters for scoring and the scores for each item in each cluster are added together to provide a cluster score. These seven scores are then entered into a weighted equation. The cut-off score for alexithymia is zero. SAT9 scores below zero are considered alexithymic and SAT9 scores above zero are considered nonalexithymic. (For more details on calculating SAT9 scores see the Scoring Manual for the SAT9, Cohen, 1985.)

Imagery Measures

(1) *Questionnaire upon Mental Imagery (QMI)*. Sheehan's (1967) shortened form of Betts' (1909) Questionnaire Upon Mental Imagery (QMI) is available in Richardson (1969). It is perhaps the most widely used test of vividness of mental imagery. This test systematically evaluates imagery vividness in seven sense modalities: visual, auditory, cutaneous, kinesthetic, gustatory, olfactory, and organic. The QMI contains 35 items, five for each modality in which the subject is directed to image. Each evoked image is self-rated for vividness on a Likert scale ranging from 1 to 7, with 1 being the most vivid image rating. The highest possible score is 245. The test provides an overall imagery vividness score and seven subtest scores, one for each sense modality (Ernest, 1977).

White, Sheehan, & Ashton (1977) reviewed the psychometric properties of the QMI and the following information is taken from that review. The internal consistency of the test was reported to be between .95 and .99 (alpha coefficient), and .91 and .93 (split half). Test-retest

reliability estimates for the total scale ranged from .54 after 12 months to .91 after six weeks. Test-retest reliability estimates for the subscales ranged from .32 (kinesthetic) to .58 (olfactory) at one year, and from .61 (organic) to .82 (cutaneous) at six weeks. Application of factor analytic methods to QMI intertest studies, which correlated the QMI with other imagery tests, have provided evidence for moderate construct validity. White et al. (1977) reviewed the significant relationships found between individual differences in imagery ability and a variety of other functions which attest to the validity of the QMI. There is some evidence that the QMI is affected by a social desirability response set, although the research is conflicting in this regards. Also, some studies have found that females report more vividness in mental imagery.

(2) *Short Imaginal Processes Inventory.* Jerome Singer and colleagues (e.g., J. Singer & Antrobus, 1963; Starker & J. Singer, 1975) developed an extensive questionnaire measure of daydream processes. The original scale is a 400-item, 29-scale inventory representing attitudes toward content or structure of daydreams or patterns of attention to daydreams. Jerome Singer and John Antrobus (1972) "regard daydreaming and the stream of consciousness as a special ongoing manifestation of man's image-making capacities" (p. 176). Huba (1980) has stated that the original scale "has the necessary face validity for it to be considered a measure of daydreaming rather than of inner experience with low likelihood of external referents (fantasies)" (p. 633). Thus, the scale appears to be tapping an imagery dimension related to intentionality, that is, reports of passive, spontaneous, involuntary imagery, as opposed to directed imagery.

Repeated factor analyses of the 400-item inventory revealed three second order mental style factors: Positive-Constructive Daydreaming; Guilt and Fear of Failure Daydreaming; and Poor Attentional Control. This last factor seems less a factor of ongoing stream of consciousness daydreaming than of difficulty in sustaining attention to daydreams and other inner experiences (Tower & J. Singer, 1981).

Based on these three factors, Jerome Singer and colleagues developed a shorter, 45-item daydream measure, containing three 15-item scales (Huba, Singer, J., Aneshensel, & Antrobus, 1982). These scales are referred to here as positive daydream imagery, negative daydream imagery, and poor attention. Each scale item is a self-descriptive statement which the subject rates on a Likert scale from 1 (Definitely Untrue) to 5 (Very True). "My daydreams often leave me with a warm, happy feeling," is an example of an item from the positive daydream imagery scale. A negative daydream imagery scale item is, "My daydreams often contain depressing events which upset me." "I am the kind of person whose thoughts often wander," represents the poor attention scale.

The author has taken the psychometric information provided here from the published Test Manual (Huba et al., 1982), unless otherwise indicated. The factor structure of the daydream imagery scales is stable and closely resembles that found in the longer, 400-item inventory. Also, Huba and Tanaka (1984), using the three shorter, 15-item scales, have replicated a comparable factor structure using different samples. The three dimensions were largely uncorrelated. Alpha coefficients were between .80 and .83 for the three scales. Test-retest reliability was not reported separately for the shorter imagery scales. Reliability coefficients for the 400-item version, at intervals of six to eight weeks, on average, have been generally in the .80 to .90 range (Cundiff & Gold, 1979). Giambra (1978) conducted a test-retest reliability study with administration one to two years apart. The unweighted mean correlation of all 28 scale scores was .65. Huba et al. (1982) did not provide individual scale correlations. In the Test Manual for the daydream imagery scales they stated that the scale scores are not unduly confounded by age, sex, or ethnicity. Scores were approximately normally distributed. Norms are presented in the Test Manual. Positive imagery and negative imagery scores appear to represent a measure of spontaneous daydream imagery as it relates to imagery in the ongoing stream of consciousness rather than directed imagery.

(3) Figural, Symbolic, and Mimetic Scales. The figural, symbolic, and mimetic imagery scales are found in Cartwright et al. (1978). The author has taken the psychometric information for these scales from a series of studies by Cartwright and his colleagues (Cartwright, 1980; Cartwright et al., 1983; Cartwright et al., 1978). These researchers developed the scales in an attempt to measure the three imagery representational processes. Differences in the strength of the figural, symbolic, and mimetic imagery representational modes are inferred from subjects' ratings of vividness of the images aroused by phrases thought to tap one or the other of the three imagery processes. Sample items, one from each of the three scales, in order, are: "A high shelf"; "World peace"; "How (someone you know) feels when they are proud of something." These three imagery scales each have 12-items. They make use of seven-point Likert scales, with scale-points ranging from lowest vividness (1) to highest vividness (7). In a number of studies, the authors found these scales to have alpha coefficients between .75 and .80. Test-retest reliability correlations, with a two-week interval, were between .64 and .71. The mean values were extremely stable over the two week period.

Cognitive Style Measures

Left, Right Hemisphere and Integrated Scales. In the current study, the author used the three Human Information Processing Scales of Taggart & Torrance (1984) - - the left hemisphere, right hemisphere, and integrated scales - - to classify subjects according to cognitive style. Previous researchers have accumulated fairly extensive norms, reliability data, and validity information; these are documented in the Administrator's Manual (Taggart & Torrance, 1984). Additional psychometric information is available in the Preliminary Norms-Technical Manual (Torrance & Reynolds, 1980). According to the 1984 manual, this measure is a 40-item, self-report, multiple-choice survey, with three scales. These scales classify respondents as to right-

hemisphere, left-hemisphere, or integrated in their style of information processing. Each item presents the respondent with three choices: one considered a right-hemisphere mode of processing information, one considered a left-hemisphere mode of processing information, and one considered an integrated mode of processing information. Subjects make a forced-choice response for each item.

The authors reported the reliability of alternate forms of repeated administrations. In one study, they reported correlations between two forms of .84, .86, and .82, for the right hemisphere scale, the left hemisphere scale, and the integrated scale, respectively. Results of other reliability studies were similar. Factor analytic studies of the measure were confirmatory of its construct validity.

Demographic and Social Questions

In order to assess the effects of other factors relevant to the present research, the author included several additional questions in the questionnaire. Subjects answered questions related to demographic information. They were asked to indicate sex, age, marital status, and occupation. The author estimated subjects' socioeconomic status (SES) from their occupational level, using the revised SES index for occupations by Blishen and McRoberts (1976). Subjects indicated their marital status as married, living with someone as if married, separated or divorced, widowed, or never married.

Because some measures used in this study (e.g., sensory imagery subscales) are sometimes found to be affected by a social desirability response bias, the author included a measure of social desirability. Eight questions consisted of a short form of the Marlowe-Crowne Social Desirability Scale (SDS) (Crowne & Marlowe, 1960; 1964), which is based on the work of a number of researchers (Greenwald & Satow, 1970; Strahan & Gerbasi, 1972) and which was

developed by Ray (1984). The reliability alpha for this eight-item scale has ranged from .65 to .77, with a mean of .73, over four subject samples and in two languages. Half of the items are keyed positively and half negatively to avoid a response set bias (Ray, 1984).

The researcher included a brief set of four questions related to lateral preference in order to assist in the scoring of the left hemisphere, right hemisphere, and integrated cognitive style measures. He took these four questions from a behaviourally validated self-report inventory which includes an assessment of handedness (Coren, Porac, & Duncan, 1979).

Finally, the author, through instructions included in the questionnaire, asked subjects to rate their relationship and communication with their spouses and their relationship with each parent. If subjects were currently married or living with someone as if married, they were asked to rate the quality of their relationship with their spouse and to rate the quality of communication between them and their spouse on a rating scale ranging from 1 (very good) to 5 (very bad). As well, the author asked subjects to rate the quality of their relationship with their mother and with their father on the same five point scale. If one or both parents were deceased, the rating was to refer to the relationships the subjects had with their parents while they were alive.

Procedure

The researcher asked subjects to volunteer for the study through a covering letter that described the research in a general way and indicated what would be required of them should they agree to participate. (See Appendix A.) Participating clinical subjects were required to sign a hospital approved consent form and nonclinical subjects signed a similar form. (See Appendix B.) The author offered feedback on research results to all participants and he included his name and telephone number on the consent form so that subjects could contact him if they wanted to. All subjects received a copy of the consent form. In the consent form and questionnaire the researcher assured all subjects that their responses would remain anonymous and confidential.

The researcher tested clinical subjects at the Gertrude Levin Pain Clinic. He assessed control subjects at the private business where he recruited them for the study.

Subjects filled out the questionnaire, with the various scales presented in the order shown in Appendix C. Subjects completed the measures in accordance with the standard instructions for each test with minor modifications, were required, to fit the testing format of the current study. Subjects were given as much time as they required to complete the questionnaire. The researcher administered and hand scored all measures according to the standard instructions for each test. The researcher scored all SAT9 protocols without knowledge of the subjects' group membership or scores on other measures.

On the questionnaires completed by the 48 nonclinical subjects four test scores could not be calculated. These missing data consisted of two SAT9 scores, an SES score and a mimetic imagery score. Twenty-two of the 64 clinical subjects' questionnaires contained inadequate data for the calculation of one each of the SES, symbolic imagery scale, and mimetic imagery scale scores, and 22 SAT9 scores. Rather than drop these subjects from the analyses the author used the *BMDP* (1983) STEP statistical procedure for missing data. This program estimated the missing scores using a Stepwise Multiple Regression procedure with 25 demographic and substantive variable scores as predictors. The author substituted the estimated scores for the missing values in all further analyses. This permitted the retention of all subjects, resulting in a clinical group of 64 subjects and a nonclinical group of 48 subjects.

The author performed further analyses using the *SAS* (1985), *SPSS* (1986, 1988), and *Lisrel VI* (Joreskog & Sorbom, 1984) statistical programs.

CHAPTER III

RESULTS

The author presents the results of the study in four parts. He describes the preliminary analyses in Part I. These include examination of the sample distribution, identification of any significant covariates, and comparison of the clinical and nonclinical groups of subjects. In Part II, he presents the descriptive characteristics of the participants for the clinical and nonclinical groups. In Part III, the author presents the results for the main focus of the study. Part III. A, examines the relationship between the imagery measures and the alexithymia measures. Part III. B, presents the data on the relationship between alexithymia and cognitive style. Finally, the author examines the results of subsidiary analyses in Part IV.

I. Preliminary Analyses

I. A. Distribution of the Variables

In the nonclinical group the distribution of scores on the alexithymia scale was lognormal, that is, the distribution was positively skewed with scores piling up at the lower end of the scale. This is as would be expected for the alexithymia scale because most nonpatients do not report large numbers of characteristics congruent with alexithymia. Also, there was a restriction in scoring range with the lowest possible score being 26. The distribution for the seven sensory imagery subscales was positively skewed within both groups. This would also be expected on these scales (in which a lower score represents higher imagery vividness) because most people

achieve moderate to high imagery vividness. Also, the lowest score that could be obtained on each of these scales was 5.

Scores on the SAT9 and remaining imagery measures tended to be negatively skewed for similar reasons.

The researcher wanted to determine if these findings would affect the outcome of the research. In other words, would outcome be affected if the data were transformed to a normal distribution. The author conducted transformations using the log and square root for those variables that were positively skewed. For variables that were negatively skewed, he used second and third power transformations.

The author carried out correlational analyses on the original values and then on the transformed values of the variables in question. The transformations did not alter the results appreciably. Therefore, further analyses are based on the original values.

1. B. Testing for Covariates

Before proceeding with the analyses, the author decided it was important to determine whether extraneous subject characteristics might be responsible for observed relationships between the variables of interest. Pearson product moment correlations between subject characteristics (sex, age, SES, SDS), the alexithymia measure and its subscales (body/feelings, communicate feelings, daydream, concreteness), the SAT9, and the cognitive style measures (left and right hemisphere, integrated scales) are presented in Tables 1 and 2. No significant correlations existed between subject characteristics and the measures in question for the nonclinical group. However, an examination of Table 1 reveals several significant correlations for the clinical group. Significant relationships ranged from a moderate correlation of $-.29$ ($p < .05$) between the alexithymia

Table 1

Correlation of Alexithymia and Cognitive Style Measures with Demographic and Social Variables for the Clinical Group

Variable	Demographic and Social Variables			
	Sex	Age	SES	SDS
Alexithymia Scale	.01	.15	-.35**	-.11
Alex-Body/Feelings Subscale	.07	.04	-.37**	-.21
Alex-Communicate Feelings Subscale	.11	.03	-.29*	-.31*
Alex-Daydream Subscale	-.17	.14	.17	.32*
Alex-Concreteness Subscale	.05	.16	-.20	.08
Fantasy Measure (SAT9)	-.10	.17	.62***	-.15
Left Hemisphere Scale	.12	.16	-.09	.01
Right Hemisphere Scale	-.07	-.13	.15	-.19
Integrated Scale	-.03	-.02	-.04	.14

Note. Higher scores on the alexithymia scale and its subscales = a greater degree of alexithymia, whereas the reverse is true of the fantasy measure (SAT9); a higher score on the left or right hemisphere scales = a cognitive style compatible with greater reliance on the respective hemisphere, with a higher score on the integrated scale = no hemispheric preference; SES = socioeconomic status, a higher SES score = higher status; SDS = social desirability scale, a higher SDS score = greater need to appear socially desirable; N = 64;

* $p < .05$; ** $p < .01$; *** $p < .0001$;

Table 2

Correlation of Alexithymia and Cognitive Style Measures with Demographic and Social Variables for the Nonclinical Group

Variable	Demographic and Social Variables			
	Sex	Age	SES	SDS
Alexithymia Scale	.02	-.15	-.20	.02
Alex-Body/Feelings Subscale	.01	-.21	-.22	-.15
Alex-Communicate Feelings Subscale	.11	-.18	-.12	.04
Alex-Daydream Subscale	-.02	.19	.03	.18
Alex-Concreteness Subscale	-.01	-.07	.02	.05
Fantasy Measure (SAT9)	-.17	-.11	.15	-.15
Left Hemisphere Scale	.01	-.04	.01	.10
Right Hemisphere Scale	.00	-.02	-.08	-.17
Integrated Scale	-.01	.05	.06	.07

Note. For direction of scoring and abbreviations see Table 1; *N* = 48;

communicate feelings subscale and SES, to a substantial correlation of .62 ($p < .0001$) between the fantasy measure (SAT9) and SES. Significant correlations were also found between the alexithymia scale and SES ($r = -.35, p < .01$), and between the body/feelings subscale and SES ($r = -.37, p < .01$). The significant correlations between the measures of alexithymia and its components, the SAT9, and SES scores in the clinical group suggest that those whose higher scores on one or more alexithymia measures indicate increased alexithymic traits tend to have a lower socioeconomic status.

Again in the clinical group, the significant correlation ($r = -.31, p < .05$) between the communicate feelings subscale and the SDS suggests that as subjects score higher on this alexithymia subscale they express less need to present in a socially desirable manner. On the other hand, a significant correlation ($r = .32, p < .05$) between the daydream subscale and the SDS indicates that higher scores on the daydream subscale (indicating less daydreaming) are related to a greater need to present oneself in a socially desirable manner.

Because of the substantial influence of SES and the SDS on some of the measures of the alexithymia components, the author has controlled for the effects of SES and the SDS where possible and appropriate in further analyses.

1. C. Comparison of the Two Groups

The author used version VI of *Lisrel* (Joreskog & Sorbom, 1984) to compare the two groups of subjects on all alexithymia and imagery variables. The left-hemisphere, right-hemisphere, and integrated scale scores were omitted from this analysis due to the problem of multicollinearity which arose in running this program when these variables were included. This statistical program permits one to compare the pattern of relationships among the relevant variables in the clinical group with the pattern of relationships among the same variables in the

nonclinical group. The resulting chi-square gives an estimate of the likelihood of the pattern of relationships being the same, with a high chi-square indicating the groups are significantly different. The Lisrel analysis comparing the two groups produced a $\chi^2 (171, N = 112) = 308.28, p < .001$. This is indicative of a very significant difference in the pattern of relationships among the variables between the clinical and nonclinical groups. This indicates that the two groups are not comparable and should not be analyzed through pooling the subjects. Therefore, the author conducted all further analyses on each group separately unless otherwise indicated.

II. Descriptive Characteristics of Participants

A total of 112 subjects took part in this study. There were 64 clinical subjects and 48 nonclinical subjects. The demographic and social characteristics for each group are presented in Table 3. As can be seen in this Table, subjects in the clinical group ranged in age from 23-81 years ($M = 44.8$ years). The nonclinical group was more restricted in age range (22-49 years) and younger ($M = 33.2$ years) than the clinical group.

Also, the clinical group had a mean SES score of 42.4 compared to 51.7 for the nonclinical group. A higher score on the SES measure indicates a higher SES.

SDS scores averaged 4.6 and 2.9 for the clinical and nonclinical groups, respectively. A higher score indicates a greater need to present oneself in a socially desirable manner. Whereas the percentage of males and females was almost equal in the nonclinical group, the clinical group consisted of more females than males (62.5 % vs. 37.5 %). Table 3 indicates that the clinical group participants were more often married (42.2 %) or separated or divorced (31.3 %), whereas the nonclinical group subjects were more often to have never been married (33.3 %) or to be living with someone as if married (18.8 %).

Table 3

Demographic and Social Data by Group

Variable		Clinical Group (N=64)	Nonclinical Group (N=48)
Age	<i>M</i>	44.8	33.2
	<i>SD</i>	13.7	6.5
	Range	23-81	22-49
SES	<i>M</i>	42.4	51.7
	<i>SD</i>	12.2	12.6
	Range	25-67	27-72
SDS	<i>M</i>	4.6	2.9
	<i>SD</i>	2.2	2.0
	Range	0-8	0-7
Sex:Male	<i>N</i>	24	25
	%	37.5	52.1
Female	<i>N</i>	40	23
	%	62.5	47.9
Marital Status: Married	<i>N</i>	27	14
	%	42.2	29.2
Widowed	<i>N</i>	4	1
	%	6.3	2.1
Separated/ Divorced	<i>N</i>	20	8
	%	31.3	16.7
Never Married	<i>N</i>	7	16
	%	10.9	33.3
Living With	<i>N</i>	6	9
	%	9.4	18.8

Note. SES = socioeconomic status, a higher SES score = higher status; SDS = social desirability scale, a higher SDS score = greater need to appear socially desirable; Living With = living with someone as if married;

III. Primary Analyses

III. A. Hypotheses 1 and 2

Clinical Group. The author employed factor analytic procedures in order to explore the relationship between the components of the alexithymia construct and several imagery dimensions. He used these analyses to attempt to confirm the first two hypotheses which stated that the measures of the various imagery dimensions and of the alexithymia components would load together on one or more factors.

The researcher used the *SPSS* (1986) program to conduct an exploratory factor analysis on the clinical group employing the principal components option. All 18 alexithymia and imagery variable scores were entered into the analysis. Initially, the default option, using the criterion of eigenvalues greater than one (Cattell, 1966), determined the number of factors to be retained. Two strong factors emerged. However, a few variables fell alone or in couplets, which was not enough to define additional factors. Therefore, the author conducted the same analysis again, but this time restricting the number of factors to two.

The two retained factors accounted for 47.1 % of the variance. Factor 1 accounted for 32.5 % and Factor 2 for 14.5 % of the variance. Table 4 presents the unrotated factor loadings for the clinical group.

The author initially employed the direct oblimin rotation method. This method permits the factors to correlate. The interfactor correlation was .09, indicating that the two factors are not even moderately related. Therefore, the author conducted a varimax rotation. The varimax rotated factor loadings can be found in Table 5.

After rotation the first factor is a unipolar factor and appears to best be interpreted as representing imagery, and is thus labeled as such. This Imagery factor includes all seven of the

Table 4

Unrotated Factor Loadings for Imagery and Alexithymia Variables for the Clinical Group

Variable	Factor 1	Factor 2
Cutaneous Imagery Subscale	.80	-.23
Kinesthetic Imagery Subscale	.80	-.11
Auditory Imagery Subscale	.80	-.16
Figural Imagery Scale	-.78	.05
Mimetic Imagery Scale	-.72	.25
Olfactory Imagery Subscale	.71	-.14
Gustatory Imagery Subscale	.71	-.02
Visual Imagery Subscale	.68	-.15
Organic Imagery Subscale	.65	-.32
Symbolic Imagery Scale	-.44	.09
Alex-Concreteness Subscale	.18	-.17
Alex-Body/Feelings Subscale	.37	.77
Negative Daydream Imagery Scale	.28	.68
Alex-Communicate Feelings Subscale	.50	.64
Alex-Daydream Subscale	-.04	-.59
Poor Attention Scale	.43	.52
Fantasy Measure (SAT9)	-.23	-.35
Positive Daydream Imagery Scale	-.11	.27

Note. Higher scores on the seven sensory imagery scales = decreased imagery vividness; higher scores on the figural, mimetic, and symbolic imagery scales = increased imagery vividness; higher scores on the positive and negative daydream imagery scales = an indication of the positive or negative emotional quality of the daydream imagery, respectively; a higher score on the poor attention scale = increasing difficulty with attention to internal processes; higher alexithymia scale or subscale scores = greater alexithymia, whereas the reverse is true of the fantasy measure (SAT9);

Table 5

Varimax Rotated Factor Loadings for Imagery and Alexithymia Variables for the Clinical Group

Variable	Factor 1	Factor 2
Cutaneous Imagery Subscale	.83	.05
Auditory Imagery Subscale	.81	.11
Kinesthetic Imagery Subscale	.79	.16
Mimetic Imagery Scale	-.76	-.01
Figural Imagery Scale	-.75	-.21
Olfactory Imagery Subscale	.72	.11
Organic Imagery Subscale	.72	-.09
Visual Imagery Subscale	.69	.08
Gustatory Imagery Subscale	.67	.22
Symbolic Imagery Scale	-.44	-.07
Alex-Concreteness Subscale	.22	-.10
Alex-Body/Feelings Subscale	.10	.85
Alex-Communicate Feelings Subscale	.26	.77
Negative Daydream Imagery Scale	.04	.74
Poor Attention Scale	.24	.63
Alex-Daydream Subscale	.16	-.57
Fantasy Measure (SAT9)	-.10	-.41
Positive Daydream Imagery Scale	-.19	.22

Note. For direction of scoring see Table 4;

sensory imagery subscales and all three of the imagery representational processes scales, namely the figural, mimetic, and symbolic scales. Although it also captured the alexithymia concreteness subscale, this subscale loaded at only $r = .22$, indicating a very weak relationship with the factor.

Factor 2 captured the other three alexithymia subscales, all three daydream imagery scales, and the fantasy scale (SAT9), for a total of seven items. However, positive daydream imagery loaded with a correlation of only $.22$.

Factor 2 captured the alexithymia body/feelings and communicate feelings subscales, which Taylor (1985) labeled as Difficulty Identifying and Distinguishing Between Feelings and Bodily Sensations, and Difficulty Communicating Feelings, respectively. The direction of scoring on the SAT9, also on this factor, indicates decreased capacity for the integrated use of fantasy. Factor 2 also captured the poor attention variable, which indicates attentional problems, and the negative daydream imagery scale, which represents negative, emotionally toned, daydream imagery. The factor also contains the alexithymia daydream subscale, which seems to represent increased quantity of daydreaming. Factor 2 can perhaps best be interpreted then as an Alexithymia factor, related to feelings, bodily sensations, fantasy, and daydreams.

The direct oblimin rotation produced a factor pattern similar to the varimax rotation. A quartimax rotation also produced a factor pattern similar to direct oblimin and varimax rotations. This is, to a degree, an indication of the robustness of the factor solution presented in this analysis. However, the reader should understand that the results presented are those obtained with the particular methods employed here. Although other factor analytic techniques could have produced different factor solutions, the methods employed in the current study are standard and acceptable practices (Harris, 1975; Tabachnick & Fidell, 1983).

Nonclinical Group. The author performed identical factor analytic procedures on the same variables for the nonclinical group. The two factors were again retained, accounting for

55.6 % of the variance. The first factor accounted for 41.6 %, the second for 13.9 % of the variance. Table 6 presents the unrotated factor loadings for the nonclinical group.

The direct oblimin rotation method again resulted in an extremely low interfactor correlation of .01. Therefore, the researcher performed a varimax factor rotation.

The varimax rotation factor loadings for the nonclinical group are presented in Table 7. Examination of this Table indicates that the best interpretation of the first factor is similar to Factor 1 in the clinical group: It is again an Imagery factor. This factor contains the seven sensory imagery subscales, the three imagery representational processes scales (figural, symbolic, and mimetic), and the positive daydream imagery scale. However, this latter scale has only a small loading of -.27.

Again, as with the clinical group factor analysis, Factor 2 seems to represent a similar Alexithymia factor, that is, one related to feelings, bodily sensations, and daydreams. Again, the alexithymia daydream subscale is related to increased quantity of daydreaming. Also loading on this factor are the body/feelings, communicate feelings, and concreteness subscales of the alexithymia measure, and the negative daydream imagery, poor attention, and fantasy (SAT9) variables. The SAT9 has only a small loading of -.18. This Alexithymia factor appears to represent emotionally painful daydream imagery and problems expressing feelings and distinguishing them from bodily sensations.

Direct oblimin and quartimax rotation methods also produced a factor pattern similar to the varimax rotation, as in the clinical group. This is again, to a degree, an indication of the robustness of the factor solution presented in this analysis.

In examining the two factors across both groups, a number of points can be made. Considering the small size of the factor loading, the positive daydream imagery variable does not really fall on either factor in either group. For the same reason, the alexithymia concreteness

Table 6

Unrotated Factor Loadings for Imagery and Alexithymia Variables for the Nonclinical Group

Variable	Factor 1	Factor 2
Gustatory Imagery Subscale	.91	.06
Organic Imagery Subscale	.91	-.18
Cutaneous Imagery Subscale	.90	.09
Olfactory Imagery Subscale	.89	.02
Kinesthetic Imagery Subscale	.87	.15
Mimetic Imagery Scale	-.87	-.04
Figural Imagery Scale	-.84	-.05
Auditory Imagery Subscale	.84	.01
Visual Imagery Subscale	.83	.12
Symbolic Imagery Scale	-.48	.00
Positive Daydream Imagery Scale	-.27	.17
Alex-Communicate Feelings Subscale	-.18	.74
Alex-Body/Feelings Subscale	-.28	.71
Poor Attention Scale	.17	.70
Alex-Daydream Subscale	-.11	-.70
Negative Daydream Imagery Scale	-.35	.48
Alex-Concreteness Subscale	.13	.32
Fantasy Measure (SAT9)	-.11	-.18

Note. For direction of scoring see Table 4;

Table 7

Varimax Rotated Factor Loadings for Imagery and Alexithymia Variables for the Nonclinical Group

Variable	Factor 1	Factor 2
Gustatory Imagery Subscale	.91	.06
Organic Imagery Subscale	.91	-.18
Cutaneous Imagery Subscale	.90	.09
Olfactory Imagery Subscale	.89	.02
Kinesthetic Imagery Subscale	.87	.15
Mimetic Imagery Scale	-.87	-.04
Figural Imagery Scale	-.84	-.05
Auditory Imagery Subscale	.84	.02
Visual Imagery Subscale	.83	.12
Symbolic Imagery Scale	-.48	.00
Positive Daydream Imagery Scale	-.27	.17
Alex-Communicate Feelings Subscale	-.18	.74
Alex-Body/Feelings Subscale	-.28	.71
Poor Attention Scale	.17	.70
Alex-Daydream Subscale	-.11	-.70
Negative Daydream Imagery Scale	-.36	.48
Alex-Concreteness Subscale	.13	.32
Fantasy Measure (SAT9)	-.11	-.18

Note. For direction of scoring see Table 4;

subscale does not fall on either factor in the clinical group analysis. The same can be said of the SAT9, but for the nonclinical group analysis. In addition, in the nonclinical group, although the negative daydream imagery scale has a higher loading ($r = .48$) on the Alexithymia factor, it also loads moderately ($r = -.36$) on the Imagery factor. With the exception of these differences, the two factor solution is quite similar in both groups suggesting two distinct factors: an Imagery factor and an Alexithymia factor. The distinctiveness of the two factors is somewhat more pronounced in the clinical group, with the Alexithymia factor somewhat weaker in the nonclinical group.

Hypothesis 1 states: Lack of facility with imagery across several dimensions is positively related to the alexithymia deficits, and thus, measures of imagery and alexithymia load together on one or more factors. The direct oblimin rotation, indicating that the two factors are orthogonal, essentially disconfirms the first hypothesis. These analyses for both groups indicate that alexithymia measures and imagery measures are, in large part, independent. This is especially true for directed imagery measures, which all fell together on the Imagery factor separate from the Alexithymia factor. These directed imagery measures included all sensory imagery scales and the three scales of the representational imagery processes.

In both groups, the alexithymia daydream subscale loaded on the Alexithymia factor in such a way as to indicate increased daydreaming. As subjects had higher scores on the alexithymia body/feelings and communicate feelings subscales (indicating more alexithymia as measured by these components), they tended to have a lower score on the alexithymia daydream subscale, indicating increased quantity of daydreaming (less alexithymia as measured by this component). This is surprising and is difficult to explain.

One imagery measure, the negative daydream imagery scale, loaded moderately on the Alexithymia Factor. This measure is different in two ways from the directed imagery measures

which loaded on the Imagery factor. Firstly, it is a measure of naturally occurring, spontaneous imagery related to daydreaming, rather than directed imagery. Secondly, it is not a measure of the quantity or vividness of daydream imagery. Rather, it is a measure of type or quality (emotional tone) of the daydream imagery. The negative daydream imagery loading on Factor 2 indicates that when those who score more highly alexithymic (higher body/feelings and communicate feelings subscale scores) do have daydream imagery it is of an emotionally negative tone.

The poor attention scale also loaded on the Alexithymia factor, indicating an inability to attend to internal processes such as feeling and fantasy. The positive daydream imagery scale had a low loading on both factors in each group. Thus, positive daydream imagery does not appear to be related to alexithymia or to the imagery dimensions otherwise captured in these analyses.

Hypothesis 2 states: A problem in the integrated use of fantasy is positively related to the alexithymia deficits, and thus, measures of fantasy deficit and alexithymia load together on one factor. Hypothesis 2 was confirmed for the clinical group. A measure of the component of alexithymia related to problems in the integrated use of fantasy (SAT9) loaded with all of the alexithymia subscale scores, for the clinical group. For the nonclinical group, it did not load highly on either factor, perhaps indicating that it is measuring something unique and unrelated to either alexithymia or imagery in the nonclinical sample.

In summary, the results for hypothesis 1 indicate that it is disconfirmed: The measures of alexithymia are distinct from directed imagery measures. However, alexithymia measures are related to a measure which appears to focus on spontaneous daydream imagery with a negative emotional tone.

Hypothesis 2 is confirmed for the clinical group and disconfirmed for the nonclinical group. In the clinical group, one can say that, with these subjects, the alexithymia subscales are related to problems in the integrated use of fantasy as measured by the SAT9.

III. B. Hypothesis 3

Clinical Group. The author conducted analyses to obtain the partial correlations between the alexithymia and cognitive style measures. He obtained partial correlations between these variables by controlling for the effects of the SDS and SES. These results are presented in Table 8 for the clinical group.

Correlations between the alexithymia measures and cognitive style measures in the clinical group are small to moderate, but with several significant relationships. The alexithymia scale scores and the left-hemisphere scale scores are correlated .24 ($p < .05$). This indicates that individuals exhibiting increased alexithymic characteristics are somewhat more likely to exhibit a left-hemisphere information processing style. Only one of the alexithymia subscales is significantly correlated with any of the cognitive style scales: $r = .23$ between the daydream subscale and the left-hemisphere scale ($p < .05$). This indicates a small positive relationship between reduced daydreaming and a left-hemisphere cognitive style.

There are two significant correlations between the SAT9 (fantasy) and two of the cognitive style scales. The SAT9 and the right-hemisphere scale were correlated $-.29$ ($p < .01$). As subjects' higher scores on the right-hemisphere scale indicated a right-hemisphere cognitive style, their scores on the SAT9 were likely to be lower, indicating inhibited capacity for use of fantasy. A positive correlation of $.27$ ($p < .05$) between the SAT9 and the integrated scale suggests a small, positive relationship between an integrated cognitive style and increased capacity for use of fantasy as measured by the SAT9.

Table 8

Correlation of Alexithymia Measures with Cognitive Style Scales with SES and SDS Partialled Out for the Clinical Group

Measures	Left Hemisphere Scale	Right Hemisphere Scale	Integrated Scale
Alexithymia Scale	.24*	-.03	-.16
Alex-Body/Feelings Subscale	.11	.02	-.09
Alex-Communicate Feelings Subscale	.04	.04	-.06
Alex-Daydream Subscale	.23*	-.12	-.08
Alex-Concreteness Subscale	.14	-.10	-.03
Fantasy Measure (SAT9)	-.06	-.29**	.27*

Note. For direction of scoring see Table 1;

* $p < .05$; ** $p < .01$; $N = 64$;

Nonclinical Group. Table 9 presents the correlations between the alexithymia and cognitive style measures, for the nonclinical group. In this group, only one significant correlation was found between any of the alexithymia and cognitive style measures. The alexithymia communicate feelings subscale and the left-hemisphere scale achieved a correlation of .27 ($p < .05$). The moderate positive relationship between these two sets of scores indicates that subjects who have difficulty communicating feelings also tend to employ a left-hemisphere cognitive style.

Hypothesis 3 states: Alexithymia is positively related to a cognitive style involving left-hemisphere processes and inversely related to a cognitive style involving right-hemisphere processes. Several small, but significant, correlations between several of the alexithymia subscales and the left-hemisphere scale in the expected direction, especially in the clinical group, may have indicated partial confirmation of hypothesis 3. However, the significant SAT9 correlation with the right-hemisphere scale in the clinical group is not in the expected direction. The SAT9 is a test involving two major tasks, drawing and story telling. These tasks may draw significantly on both left and right-hemisphere processes. This may help account for the significant correlation between the SAT9 and the integrated scale. An integrated cognitive style of information processing may facilitate this task. In summary, noting the quite small, although significant, but sometimes contradictory correlations here, it cannot be said that hypothesis 3 was confirmed.

Table 9

Correlation of Alexithymia Measures with Cognitive Style Scales with SES and SDS Partialled Out for the Nonclinical Group

Measures	Left Hemisphere Scale	Right Hemisphere Scale	Integrated Scale
Alexithymia Scale	.18	.11	-.22
Alex-Body/Feelings Subscale	.09	.21	-.24
Alex-Communicate Feelings Subscale	.27*	-.01	-.19
Alex-Daydream Subscale	.22	-.19	.00
Alex-Concreteness Subscale	-.04	.10	-.05
Fantasy Measure (SAT9)	-.01	.20	-.17

Note. For direction of scoring see Table 1;

* $p < .05$; $N = 48$;

IV. Secondary Analyses

IV. A. Alexithymia and Group Membership

Because the author made use of a clinical and a nonclinical group to test the three hypotheses, it is of interest to know whether these groups differ on their alexithymia scores. And, as already noted, many investigators have hypothesized a relationship between alexithymic characteristics and psychosomatic illness or somatic complaints. Thus, the author examined the relationship between a measure of each of the components of alexithymia and clinical (pain) or nonclinical group. Table 10 presents the mean, standard deviation, and score range for each of the measures for each group.

As an overall test of significance, the author performed a one-way multivariate analysis of covariance, using two levels of group as the independent variable, with the SDS, SES, and age as covariates. The author added age as a covariate to this analysis because the two groups differ significantly in mean age. (Including sex as a covariate did not change the results of this analysis significantly.) The dependent measures were the alexithymia score, the four alexithymia subscale scores, and the SAT9. The assumption of homogeneity of slopes was met in this analysis. Using Pillai's trace criterion, the MANCOVA was significant ($F [1, 107] = 3.03, p < .01$). Subsequent univariate ANCOVAs were computed for each of the dependent variables. An examination of individual F values for each of the six alexithymia measures show two to be significant. There was a significant effect for the alexithymia daydream subscale. Scores on this measure were significantly higher in the clinical group than in the nonclinical group, indicating reduced daydreaming, for the clinical subjects ($F [1, 107] = 6.19, p < .05$). SAT9 scores also differed significantly between the two groups ($F [1, 107] = 7.79, p < .01$), indicating that the clinical subjects scored in the direction of more inhibited capacity in the fantasy component of alexithymia than the nonclinical group.

Table 10

Summary Data for the Alexithymia Measures

Variable		Clinical Group (N=64)	Nonclinical Group (N=48)
Alexithymia Scale	M	68.55	61.31
	SD	11.72	9.73
	Range	40-90	41-86
Alex-Body/Feelings Subscale	M	29.72	25.85
	SD	9.83	6.54
	Range	12-55	12-44
Alex-Communicate Feelings Subscale	M	17.77	17.23
	SD	5.22	4.55
	Range	7-28	8-32
Alex-Daydream Subscale	M	14.78	11.33
	SD	4.38	3.23
	Range	6-25	6-20
Alex-Concreteness Subscale	M	14.47	14.27
	SD	4.13	3.75
	Range	6-26	6-23
Fantasy Measure (SAT9)	M	-0.46	0.81
	SD	0.99	1.40
	Range	-2.15-3.08	-2.38-3.12

Note. For direction of scoring see Table 1;

The daydream subscale and the SAT9 indicated both significantly reduced daydreaming and capacity for use of fantasy, respectively, in the clinical group as compared to the nonclinical group.

These results are presented in Appendix D.

IV. B. Alexithymia and Pain Evaluation

The author asked the attending physician at the pain clinic to evaluate whether, in his clinical opinion, the patient was experiencing pain of a greater intensity or duration than was expected based upon the known medical condition. The physicians' responses were dichotomous. Physicians' evaluations for two of the 64 patients were not available leaving 62 subjects for this analysis.

The author again performed a one-way MANCOVA, this time using the physicians dichotomous pain evaluation as the independent variable. The dependent measures were the same as those reported in the previous analysis. SES and the SDS were covariates in this analysis. (Including age and/or sex as covariates did not significantly change the results of the analysis.) The assumption of equivalence of slopes for the two groups was met for this analysis. Using Pillai's trace criterion, the MANCOVA was significant ($F [1, 58] = 2.41, p < .05$). Subsequent univariate ANCOVAs for each dependent measure revealed a significant effect for the alexithymia concreteness subscale ($F [1, 58] = 6.65, p < .05$). These results are presented in Appendix E.

The results indicate that subjects who were more likely to be judged by the physician as experiencing pain of greater intensity or duration than was expected based on medical condition scored significantly lower ($n = 22, M = 13.09$) on the concreteness subscale than subjects not judged so ($n = 40, M = 15.20$). Thus, with only one alexithymia subscale related to pain

evaluation, and that in a direction opposite to what was expected, one can infer that alexithymia is not related to pain evaluation in a substantial way.

IV. C. Alexithymia and Relationship Variables

Although the relationship between alexithymia, marital status, and interpersonal relationships was not a focus of the current study, the author collected some data on this. He dropped the widowed category, due to the very small number of subjects who classed themselves as widowed, resulting in the loss of three subjects from the clinical group and one from the nonclinical group, for this analysis. He combined the married and living with someone as if married categories, and the separated or divorced and never married categories. Thus, the first category included those currently more likely to be in a long-term relationship and the second category consisted of those subjects not with such a relationship. The researcher believed these two categories might indicate those who were more successful in their long-term relationships versus those who were not so successful. He also believed that those subjects with higher scores on measures of one or more alexithymia traits would be less successful in their relationships, that is, less likely to be in a relationship.

This new variable, referred to as relationship status, provided a categorical variable for the examination of the several alexithymia variables. A MANCOVA, similar to the two previous analyses, was performed for each group, with SES and SDS scores as covariates, but this time using the two levels of relationship status as the independent variable. (Including age and/or sex as covariates did not appreciably change the results of this analysis.) Again, for this analysis, the assumption of homogeneity of slopes was met.

Again using Pillai's trace criterion, the MANCOVAs resulted in nonsignificant F values for the clinical group ($F [1, 56] = 1.45, p < .21$) and the nonclinical group ($F [1, 43] = 1.12, p <$

.37). Mean scores for each level of relationship status for each independent variable and for each group are available in Appendix F. Alexithymia was not related to relationship status for either group in this study.

Next, the author analysed the subjects' ratings of the quality of relationship and communication with their spouse, and the quality of relationship with their parents. Tables 11 and 12 present the correlations between alexithymia measures and marital and parental relationships, and marital communication, with the SDS and SES partialled out, for the clinical and nonclinical groups.

In the clinical group, a higher score on the alexithymia variable was moderately, positively, and significantly correlated ($r = .35, p < .05$) with subject ratings of their marital relationship as bad. One of the alexithymia subscale scores, the concreteness subscale, also had a small, positive, and significant correlation ($r = .30, p < .05$) with a poor marital relationship. None of the alexithymia measures correlated significantly with the marital communication variable, in the clinical group.

In the nonclinical group, there was a moderate, positive, and significant correlation between the alexithymia scale and quality of marital relationship variable ($r = .37, p < .05$) and between the alexithymia body/feelings subscale and the quality of marital relationship variable ($r = .39, p < .05$). Once again, this indicates that as alexithymic characteristics increase, and in particular, as those characteristics related to the subscale indicating difficulty identifying and distinguishing between feelings and bodily sensations increase, the quality of the marital relationship is judged to be poorer. Again, no alexithymia variables were significantly related to the marital communication variable.

These results indicate that high scores on the alexithymia scale were associated with self-judged poorer marital relationship in both groups. The particular alexithymia subscale associated

Table 11

Correlation of Alexithymia Measures with Marital and Parental Relationships with SES and SDS Partialled Out for the Clinical Group

Measure	Marital and Parental Variables			
	Marital ¹ Relat.	Marital ¹ Commun.	Relat. ² Mother	Relat. ² Father
Alexithymia Scale	.35*	.17	.15	-.03
Alex-Body/Feelings Subscale	.29	.11	.10	-.10
Alex-Communicate Feelings Subscale	.24	-.05	.09	-.17
Alex-Daydream Subscale	-.13	-.08	-.02	.03
Alex-Concreteness Subscale	.30*	.27	.08	.10
Fantasy Measure (SAT9)	-.02	.08	-.06	-.06

Note. Higher scores on the alexithymia scale and its subscales = a greater degree of alexithymia, whereas the reverse is true of the fantasy measure (SAT9); Marital Relat. = quality of marital relationship, Marital Commun. = quality of marital communication; Relat. Mother and Relat. Father = quality of relationship with mother and father, respectively; higher scores on the marital relationship, relationship with, mother, relationship with father, and marital communication variable = poorer quality of relationship or communication;

* $p < .05$; (1) $N = 34$, (2) $N = 59$;

Table 12

Correlation of Alexithymia Measures with Marital and Parental Relationships with SES and SDS Partialled Out for the Nonclinical Group

Measure	Marital	and	Parental	Variables
	Marital ¹ Relat.	Marital ¹ Commun.	Relat. ² Mother	Relat. ² Father
Alexithymia Scale	.37*	.33	-.12	.07
Alex-Body/Feelings Subscale	.39*	.32	-.12	.00
Alex-Communicate Feelings Subscale	.27	.10	-.22	-.11
Alex-Daydream Subscale	-.11	-.10	-.01	.26*
Alex-Concreteness Subscale	.06	.17	.01	-.16
Fantasy Measure (SAT9)	.23	.18	-.26*	-.03

Note. For direction of scoring and abbreviations see Table 11;

* $p < .05$; (1) $N = 26$, (2) $N = 47$;

with this poor marital relationship differed for each group, with the concreteness subscale related in the clinical group, and the body/feelings subscale related in the nonclinical group.

There were no significant correlations between the alexithymia scale and quality of relationship with mother and relationship with father variable in the clinical group. There was a small, significant correlation ($r = -.26, p < .05$) between the SAT9 and the relationship with mother variable in the nonclinical group. As scores on the SAT9 indicated decreasing capacity for use of fantasy, the subjects' relationship with their mothers are reported as poorer. The nonclinical group subjects also exhibited a small but significant, positive correlation ($r = .26, p < .05$) between the alexithymia daydream subscale and the relationship with father variable, indicating that for these subjects less daydreaming may be somewhat related to a poorer relationship with their fathers.

Only one of the several measures of alexithymia and its components is associated with each of the quality of relationship with mother and with father variables in the nonclinical group, and none is associated in the clinical group; therefore, one can infer that alexithymia is not significantly related with the subjects' reported relationship with their mother or father in this study.

CHAPTER IV

DISCUSSION

Previous authors have hypothesized that imagery deficits are part of the alexithymia construct. However, much of this assumed association was based on clinical, anecdotal information and little was based on systematic, empirical research. Also, not one of these authors indicated an awareness of the complexity of the imagery phenomena in question. The primary focus of the current study was the systematic examination of the relationship between alexithymia and imagery, taking into account at least some of the complexity of the multidimensionality of imagery processes.

In addition, previous researchers have explored the possibility of a relationship between alexithymia and brain, hemispheric laterality and have suggested that alexithymics exhibit a neurologically grounded cognitive style. However, these researchers did not examine cognitive style per se in those exhibiting a greater degree of alexithymic traits. Thus, in a second focus of the current study, the author examined the relationship between cognitive style and the various components of alexithymia. In this study, the researcher also carried out a number of subsidiary analyses involving such things as the relationship of alexithymia to marital status, group membership, etc..

I. The Hypotheses

I. A. Hypothesis 1

The results of this study clearly indicate that measures of alexithymia and measures of directed imagery are distinct: They do not correlate with each other. The author derived this finding from the use of directed imagery tasks.

Those with alexithymic characteristics are thought to be preoccupied with bodily concerns and to confuse feelings and bodily sensations. Consequently, we might have expected that the organic and kinesthetic (directed) sensory imagery subscales would be especially related in some way to alexithymia, but this was clearly not so. The alexithymia measures were unrelated to directed imagery scales across all of the sense modalities measured. In a similar way, we might have expected at least some of the imagery representational processes, referred to as figural (concrete), symbolic (abstract), and mimetic (personal) imagery, to be related to alexithymia. Again, this was not the case. All of these types of imagery were measured in directed imagery tasks, and no types of directed imagery measured in this study correlated in such a way that it made sense to consider them as part of the alexithymia construct.

One non-directed, that is, spontaneous imagery, measure did correlate with the subscales of the alexithymia measure. This was the negative daydream imagery scale. This scale seems to focus on imagery with a negative emotional tone. As subjects' alexithymia body/feelings and communicate feelings subscale scores (in the clinical group analysis), and including the concreteness subscale scores (in the nonclinical group analysis) increased, indicating a greater degree of alexithymia, negative daydream imagery scale scores increased. The latter is not a measure of quantity of imagery, but of type or emotional quality of the imagery. Therefore, generally we can say that as scores on measures of alexithymic traits increase, the subject has

more of his imagery - - whatever amount of imagery there is - - emotionally negative in tone. The poor attention subscale also fell on the same factor that the alexithymia subscales loaded on. The poor attention scale is, however, less a measure of imagery than an indication of difficulty attending to internal mental processes.

Three or four (depending on the group analysis) of the alexithymia subscales loaded on the same factor, which seems to show that they all express or are aspects of a unidimensional construct. The author found such a result even when the number of factors was not restricted to two. Previous theoreticians and researchers have, however, strongly suggested that alexithymia consists of a number of important constituents. Indeed, the principal measure of alexithymia, which the author used in this study, employs a four-factor model to define alexithymia. We might be tempted to conclude, from the results of this study so far presented, that alexithymia is instead a unidimensional construct. Such a conclusion would be clearly unwarranted and premature, in light of the data so far presented. The present author found a high correlation between the body/feelings subscale scores and the communicate feelings subscale scores ($> .65$ for both the clinical and nonclinical groups, whether or not significant covariates were partialled out)¹, but found only small to moderate correlations (.10 to .30) among the other alexithymia subscales, with significant covariates partialled out. Therefore, the alexithymia subscales likely clustered together in these factor analyses, not because alexithymia is a unidimensional construct, but because of the small number of items which turned out to be related to alexithymia in the analyses. There were not enough relevant items to form strong, separate factors for each of the independent alexithymia subscales found in previous research.

¹ Previous research (Taylor et al., 1985) also found a substantial correlation (.55) between the body/feelings and communicate feelings subscales.

Although the alexithymia subscales did tend to fall together on the Alexithymia factor as expected, the daydream subscale constituted a separate pole of this factor. When subjects' other alexithymia subscale scores indicated increased alexithymia, as defined by those components, the subjects' daydream subscale scores tended to indicate decreased alexithymia, as expressed in increased daydreaming. This is surprising and difficult to explain. Perhaps, beyond being an Alexithymia factor, the factor may represent a more basic psychopathology dimension. This factor seems to involve an increasing degree of alexithymia on measures of three of the alexithymia traits, on the one hand, and less alexithymia (increased daydreaming) on a measure of one alexithymia trait, on the other hand.

1. B. Hypothesis 2

The SAT9 measure was related to some of the other components of the alexithymia construct as measured by the alexithymia subscales in the clinical group. The SAT9 appears to be capturing an important aspect of the alexithymia construct with these subjects. This test is a quantitative measure of the subjects' capacity for use of fantasy. Those who developed the SAT9 (e.g., Cohen, 1985) have stated that subjects whose scores on this measure are lower are manifesting fantasy which is inhibited, and thus, cannot be used to acknowledge and resolve conflicts and the resulting anxiety. It is interesting that the SAT9 loaded with the alexithymia body/feelings and communicate feelings subscales. This seems to suggest an association between reduced fantasy capacity and inability to acknowledge or resolve anxiety, on the one hand, and problems communicating feelings and distinguishing them from bodily sensations, on the other. Of course, many people, over the years, have suggested a relationship between somatization and unexpressed affects (Alexander et al., 1968; Krystal, 1988; Sifneos, 1973). In the present study, we may in fact be capturing here some facet of this association.

Again, we should remember that the SAT9 might have loaded together with only one of the alexithymia subscales had there been other relevant items in the factor analyses. This not being the case, we cannot ascertain from these analyses with which subscale(s) of alexithymia (body/feelings, communicate feelings) the SAT9 is most closely associated.

1. C. Hypothesis 3

This hypothesis, that alexithymia is related to cognitive style, is grounded in the brain hemispheric dominance literature. Herrmann (1981) stated that "for most of us, one of the two hemispheres is the dominant one in terms of our preferred mode of processing. This concept of dominance, however, should not be thought of as a dichotomy, but rather as a continuum in which the dominance is distributed in various intensities between the two hemispheres" (p. 10). The present author used the left, right, and integrated scales of the Human Information Processing Survey in an attempt to assess individuals in terms of this information processing preference. Previous researchers found that the right-hemisphere scale is correlated with tasks thought to be predominately mediated by right-hemisphere processes. For example, the right-hemisphere scale is significantly and positively correlated with many tests of creativity, such as Rorschach Movement scores, Rorschach Originality scores, and many subscales of the Torrance Tests of Creative Thinking. The left-hemisphere scale is significantly and negatively correlated with the same tests (Taggart & Torrance, 1984).

Researchers have described the left hemisphere as being activated by verbal, rational, and analytic functions, whereas the right hemisphere is described as being activated by feelings, fantasy, creativity, and possibly, some aspects of imagery functioning. Thus, we can see that those psychological functions observed to be impaired in alexithymic individuals are predominantly right-hemisphere processes.

However, we did not find the hypothesized relationship between alexithymia and cognitive style in the current study. Although there were several significant correlations between alexithymia scales and cognitive style scales, these were weak and not always in the expected direction. Thus, we found no consistent, strong relationship between measures of alexithymia and cognitive style in this study.

II. Secondary Analyses

II. A. Alexithymia and Group Membership

One of the alexithymia subscales, the daydream subscale, was related to clinical versus nonclinical status: Higher daydream subscale scores, indicating reduced daydreaming, were associated with subjects in the clinical group. This alexithymia subscale appears to be related to the quality or richness of one's interior world. Those who are chronic pain patients, having higher scores on the daydream subscale, may be experiencing a poverty in ongoing mental life. This is further confirmed by a second significant correlation, this one indicating a strong relationship between SAT9 scores and clinical versus nonclinical group status. The SAT9 is a measure of the fantasy component of alexithymia. The clinical group scored on the SAT9 in the direction indicating significantly reduced capacity for use of fantasy in these subjects as compared to the nonclinical group.

II. B. Alexithymia and Pain Evaluation

The author expected that patients who displayed a greater degree of alexithymia would be judged by the physician as having greater pain than would be expected based on medical condition. Instead, there was no relationship between patients judged so and the alexithymia

scale. One alexithymia subscale, concreteness, indicating less externally oriented thinking, was related to patients being judged as such by the physician. This is opposite to what the author expected, and it is unclear why this should be the case. Perhaps these patients are "internally focused," but not on their affective or fantasy life. Rather, they may be focused on their physical pain. Perhaps the alexithymia traits, in reflecting a lack of defenses, led to these patients experiencing more pain or having more awareness of pain, and thus, complaining more about it.

II. C. Alexithymia and Relationship Variables

Relationship status, that is, whether subjects were involved in a long-term relationship or not, was not related to any of the measures of alexithymia and its components. This is somewhat surprising, as more alexithymic traits might be expected to result in such people either not getting involved in a long-term relationship or of spousal dissatisfaction with such an emotionally unexpressive or unavailable partner leading to separation or divorce. However, regarding this last possibility, Flannery (1977), in a study which included an examination of spouses reaction to their alexithymic partners, reported that spouses of alexithymia patients generally did not see "the patients as qualitatively different in their emotional lives or emotional expressiveness, from other people" (p. 138).

In the current study, for those subjects who had a spouse, quality of communication with that spouse was also not related to measures of alexithymia or its components. However, quality of relationship was found to be related to the alexithymia scale. Those indicating a greater degree of alexithymia were more likely to indicate that they had a poorer quality of spousal relationship. Thus, although those who report more alexithymic traits report problems in the quality of their marital relationship, they do not appear to attribute these to problems in communication between themselves and their spouses. Those exhibiting a greater degree of alexithymic traits may have

poor communication skills but may show little concern over "communication" problems, indeed, may not wish to engage in interpersonal communication of more than a superficial nature. Therefore, it is perhaps not surprising that they do not report communication problems with their spouses. But, as noted, they do tend to rate their relationship as "bad." Flannery (1977) indicated that when relationship problems occur, it may be the result of the long-term medical involvements of the alexithymic patients. In his study, some "significant others" were "embittered" due to the "continued ill-health" of the alexithymic spouse, and others were "impatient and showed anger at the partners' failure to respond to treatment, and yet the marriages were stable enough Thus alexithymia is not a character trait that spouses seem to notice much or care about, and is certainly not incompatible with stable and apparently satisfying marital relationships, although the prolonged psychosomatic distress that can be associated with it is" (pp. 138-139). We might expect, then, that the association between measures of alexithymia and relationship dissatisfaction would only be found in the chronic pain group of the present study. However, the association held up for the nonclinical group as well, suggesting it is not just a function of long-term illness creating stress and tension in the relationship. Therefore, something more subtle may be occurring. Perhaps these subjects are not unhappy with the relationship in the sense of being affectively aware. Rather, they may somehow "know" something is not right. Finally, we can only wonder whether the spouses of these subjects are themselves alexithymic to a significant degree.

Regarding the expected correlations between the overall measure of alexithymia and the quality of parental relationships, the author found no such significant correlations. There is a suggestion of a possible relationship between the reduced fantasy measure and daydreaming subscale of alexithymia and a measure of poor parental relationships.

III. Implications of Findings

III. A. Substantive Implications

The present study illustrates the importance of making a distinction between directed and spontaneous imagery. When researchers write of problems with imagery production in those exhibiting a greater degree of alexithymic traits, we must now be aware that this does not include much of what is usually meant when such problems are spoken of. In other words, it does not seem to include directed imagery.

Researchers in neurology, such as Humphrey & Zangwill (1951), and TenHouten et al., (1985c), have indicated that their brain-traumatized patients were able to report few, if any, images, and many have taken this as further evidence of alexithymia. Although the findings of these researchers seem to implicate problems with directed imagery in those exhibiting a greater degree of alexithymic traits, such "alexithymic" patients may be a special case. In many of these patients directed imagery as well as functions related to alexithymia may both be disrupted. However, we must be very cautious in drawing conclusions about alexithymic traits in broader populations from such highly specialized samples.

Those who exhibit a greater degree of alexithymic traits, but who have not experienced such obvious and profound neurological trauma, do not appear to lose the ability to manifest directed imagery. From the current research we can see that this is true for both clinical and nonclinical samples. Although the nonclinical group cannot be seen as a true control group, it does serve as a kind of comparison group. In spite of there being some differences in the factor analytic results between the two groups, these were rather minor, and the main finding is confirmed by the two analyses: There are two strong, distinct factors in both groups - - an Imagery factor and an Alexithymia factor. Therefore, the emergence of directed imagery

measures as separate from alexithymia measures cannot be seen as an artifact of the clinical status of the subjects.

Considering the spontaneous imagery dimension, it appears that we must make a further distinction between the positive and negative emotional tone of spontaneous imagery. It was the negative emotionally toned, spontaneous, daydream imagery measure, and not the positive daydream imagery measure, that was related to the measures of the components of alexithymia. This was more clearly and strongly the case in the clinical group. It is perhaps not surprising that this type of daydream content is more closely related to alexithymia in the clinical group. After all, chronic pain is by definition a long-term aversive situation for these patients that previous researchers have associated with higher stress (e.g., Fordyce, 1976), depression, and other emotional difficulties (e.g., Catchlove et al., 1985; Heaton, Getto, Lehman, Fordyce, Brauer, & Groban, 1982). We might expect then, for chronic pain to bring about or strengthen "negative emotional imagery." Thus, any relationship between measures of alexithymia and its components and a measure of such imagery in a pain sample might be an artifact of the underlying common problem with chronic pain. However, the fact that a relationship also existed, although somewhat less strongly, between alexithymia measures and the negatively toned daydream imagery scale in the nonclinical group, suggests the case is not this simple.

III. B. Implications for Clinical Work

As the author indicated in the introduction, the question of imagery involvement in alexithymia has implications for therapeutic work with patient populations exhibiting increased alexithymic traits. Therapists using many of the newer therapies and alternatives to long-term psychoanalysis, such as cognitive-behavioural therapy, relaxation therapy, and hypnotherapy, employ directed imagery in some central way as one of the therapeutic techniques. These are just

the therapies that clinicians are using more often with difficult psychosomatic patient groups, such as chronic pain patients (e.g., Meichenbaum & Turk, 1976; Newman, Seres, Yospe, & Garlington, 1978). The results of the current study indicate that whether or not these patients exhibit increased alexithymic traits should not determine their ability to generate images if directed to do so. Success or failure of these patients in therapies using directed imagery in some important way is not likely related to their ability to produce directed imagery. Although previous authors (e.g., Kaplan & Wogan, 1976) have suggested that a problem lay with alexithymic patients being unable to generate imagery, this does not appear to be the case and the problem may lie further along the information processing pathway.

In other words, the alexithymic patient's ability to generate directed imagery says nothing about his or her ability to use those images, once they are produced, in a constructive manner. Many clinicians and researchers (Alexander et al., 1968; Sifneos et al., 1977) over the years have suggested a relationship between psychosomatic problems, including chronic pain, and decreased richness of the patient's inner life, whereby emotional life is unavailable leading to somatization (Alexander et al., 1968; Sifneos et al., 1977). Therapy has often involved attempts to break this somatization through providing the patient eventual access to his or her emotional awareness and expressiveness. It may be that, although those who exhibit increased alexithymic traits can also produce directed imagery, they cannot make use of it in therapy to gain access to their emotional life.

Clear distinctions between imagery, daydreams and fantasy are difficult to make.

Imagery is related in some way to these processes but is not identical to daydreaming or fantasy. Perhaps there is a continuum, involving increasing complexity, among other things, from directed imagery to imagery in daydreaming and imagery in fantasy. Singer (1974) has examined imagery in daydreaming and the stream of thought and sees it as quite distinct from directed imagery.

Klinger (1971) has considered fantasy, with its inherent imagery processes, as more complex than imagery alone. Although directed imagery, which does not appear to be related to alexithymia, may not be important to the richness of inner life, spontaneous daydream imagery, which does appear to be related to alexithymia, may be more intimately involved in the rich inner life of fantasy and feelings.

The constellation of measures appearing on the Alexithymia factor was such that it appears that when subjects have increased difficulty identifying feelings and distinguishing them from bodily sensations, increased difficulty communicating feelings, and decreased capacity in the use of fantasy, they have increased daydream activity of an emotionally negative, distressing type, coupled with increasingly poor control over attention to this inner world. The negative, emotionally toned, daydream imagery may involve worry, confusion, and other similar, unproductive and unfocused cognitive processes. Of course, specific, negative affects may also be involved. Overall, we achieve a picture of a chaotic and painful, inner world in which there is difficulty differentiating affects and bodily sensations and, perhaps an inability to focus on this inner world.

The ability to generate directed imagery, which does not appear to be impaired in individuals exhibiting increased alexithymia, may provide a means for therapeutic intervention into the painful interior world of these patients. In conjunction, therapists may be able to develop ways to work effectively with the emotionally painful, spontaneous imagery which these patients report in daydream content. As Krystal (1988) stated, in referring to the employment of the imaging function:

A whole field of psychology is burgeoning with techniques of applying imaging therapeutically. There is no doubt that significant advances and therapeutic modalities will evolve from these advances. . . . (Stimulating) imaging . . . is possibly the portal for the reentry into active and powerful fantasy life. (pp. 332, 337)

The association between increased alexithymia and a self-reported poor spousal relationship suggests that these subjects had some awareness of interpersonal difficulties. Of course, we do not know what explanation they might offer for such relationship problems. They may tend to externalize the situation by blaming environmental factors or their spouses. Whatever the case, this awareness of relationship problems is likely to be an added stress on those manifesting alexithymic characteristics of which the clinician should be aware. The acknowledgement of such problems by these patients in therapy may provide the clinician with another opportunity for an "in" into the patients interpersonal and emotional life.

The fact that alexithymia measures differentiated the two groups of subjects, with the clinical group exhibiting higher alexithymia scores, confirms the expected overrepresentation of alexithymic traits in clinical populations where there appear to be psychosomatic or somatizing factors at work. Many clinicians working with these populations are no doubt already aware of the propensity of these patients to exhibit alexithymic traits. The present study confirms this, suggesting that clinicians working in this area should be sensitive to the probability of patients exhibiting alexithymic traits, in order to provide the most effective medical, as well as psychological treatment.

III. C. Methodological Implications

By this research, the author has clarified, to a degree, the nature of the tests used to measure alexithymia and its components. The alexithymia measure and its subscales are unrelated to deficits in imagery as captured by the directed imagery scales. Thus, we can infer that the alexithymia construct does not include deficits in directed imagery. The spontaneous, positive daydream imagery scale was also unrelated to the alexithymia measure and its subscales. This may be an artifact of the positive daydream imagery scale. A close inspection of these scale

items reveals that they are not as "affectively loaded" as the negative daydream imagery scale items and they appear to more closely reflect cognitions related to positive attitudes instead of affects.

We do not know in what quantity negative daydream imagery was present or that it increased with higher alexithymia scale and subscale scores. However, subjects' scores on the (spontaneous) negative daydream imagery scale indicated that such imagery tended to be present, not absent, in those scoring more alexithymic. Thus, we can infer that alexithymia does not appear to involve an absolute deficit in spontaneous imagery.

The high correlation between the alexithymia body/feelings and communicate feelings subscales, coupled with their appearance on the same factor in the present study, may lead us to question whether they represent separate components of alexithymia. Difficulty in identifying feelings and distinguishing between feelings and bodily sensations, and difficulty communicating feelings may not represent independent aspects of alexithymia.

The loading of the daydream subscale in the opposite direction from the other alexithymia subscale scores is unexpected. This finding seriously throws into question either the cohesion of the alexithymia construct, as defined by the four-factor model used here, or the ability of the Toronto Alexithymia Scale to reliably and validly measure all of these aspects. Perhaps daydreaming is unrelated to alexithymia. Alternatively, the daydream subscale, with only five items, may not be capturing the importance and relationship of daydreaming to the other components of alexithymia.

The Boston school defined alexithymia by emphasizing its affective aspects. The European school, with its emphasis on *la pensée opératoire*, is more closely associated with the cognitive aspects of alexithymia. The Toronto Alexithymia Scale captures most clearly the aspects of alexithymia as defined by the Boston School: feelings and their relationship with

bodily sensations. The other components of alexithymia, as emphasized by the European school, are perhaps not as well captured by the Toronto Alexithymia Scale.

The authors of a published study (Taylor et al., 1985) of the Toronto Alexithymia Scale, which also used the Marlowe-Crowne Social Desirability Scale and the Blishen Socioeconomic Status Index, reported that the Toronto Alexithymia Scale "has minimal response set bias and is not unduly influenced by age, education, and socioeconomic status" (p. 197). Although some significant but low correlations between the alexithymia scale, its subscales, and the SDS, SES, age, and education, were reported, the variance accounted for never exceeded 4.8 %. In the current study, some correlations between the Toronto Alexithymia Scale, its subscales, and these demographic variables accounted for as much as 13.7 % of the variance, substantially higher than in the Taylor et al. (1985) study. The Toronto Alexithymia Scale and some of its subscales appear to be particularly influenced by social desirability and SES. Future researchers should take into account the influence of these variables when using the Toronto Alexithymia Scale.

The SAT9 was also highly correlated with SES. As well, the SAT9 was related to alexithymia in the clinical group only. The SAT9 may be more than a measure of fantasy. It encompasses several complex tasks which may tap perceptual and other cognitive abilities. Thus, to some extent at least, the SAT9 may capture other deficits, for example, deficits in general problem solving abilities. Perhaps the clinical subjects, but not the nonclinical subjects, were deficient in these, and thus, this scale was related in some way to alexithymia for the clinical subjects only. Future researchers, when using the SAT9, should consider the complexity of what this instrument may be measuring and its relationship to SES.

IV. Limitations of the Present Study

IV. A. Methodological Considerations

Researchers have long recognized the difficulty of accessing internal processes and subjective experiences, such as conscious imagery, not to mention the problems associated with measuring possible imagery phenomena operating below the level of conscious awareness. All imagery measures employed in this study were self-report measures. Therefore, this researcher made no attempt to measure imagery not available to consciousness. It is possible that this study has missed some important existing relationships between alexithymia and imagery not available to conscious inspection. Such relationships, if they exist, might be very different from the relationships between imagery and alexithymia found here and might be very important in understanding alexithymic traits.

In addition, self-report measures are open to the possibility of intentional deception and unintentional biases. The researcher attempted to control for these flaws. For example, where possible, the author chose measures that previous researchers found did not have such biases, and that contained both negatively and positively keyed items to avoid certain response biases. As well, the author also tried to control for subjects' possible need to "look good" by including a measure of social desirability. Indeed, this measure was one of the covariates used in some of the current analyses. In spite of these attempts, we cannot be certain of the degree of success achieved in avoiding such biases in the self-report data.

There is a further possible problem with the imagery measures used in this study. It may be that problems in imagery generation are more likely to occur in those with an increased degree of alexithymic traits when the imagery in question is anxiety producing. The author attempted to take this into account by using one imagery measure theoretically related to interpersonal and

feeling imagery (mimetic imagery scale). Because alexithymic subjects are said to have problems with feelings and interpersonal relationships, the author thought that such imagery might be more anxiety producing for these subjects. However, the items on this measure may not have been personally meaningful to the subjects. Thus, the items may not have in fact elicited anxiety that would interfere with imagery generation.

The principal measure of alexithymia and its components used in this study was also a self-report measure and, therefore, many of the same criticisms of the self-report imagery measures could apply. The researcher's use of the SAT9 as an additional measure of the fantasy component of alexithymia provides another and different means to assess alexithymic traits. Such a multimethod approach assists in overcoming some of the problems with the self-report measure of alexithymia. Concurrence in findings among the other alexithymia scale and subscales and the SAT9 strengthens the validity of the results obtained.

The measures of cognitive style used in this study were also of the self-report type. The researcher did not find the hypothesized relationship between cognitive style and alexithymia, based on research on hemispheric lateralization of function. Defining brain-behaviour relationships has long been a difficult task. It may be that alexithymia is not related to cognitive style. Or it may be that the measures used did not capture cognitive style as related to hemispheric laterality. Alternatively, the concept of lateralization of function, resulting in distinct cognitive styles, has come under increasing criticism (Allen, 1983) and may lack validity.

In this study questions about the relationship between alexithymia and marital communication, marital relationship, and relationships with the subjects' mother and father, involved only a very preliminary attempt to understand these associations. The question asked, regarding each of these associations, was simple and unidimensional in nature. Because the questionnaire was already quite long, the author did not carry out a more complete assessment of

these issues. Therefore, although we see that subjects with increased alexithymia tend to describe their spousal relationships as bad, we do not know what this means. How is it "bad"? What are the specific problems or issues? Also, these evaluations were again based on self-reports and were not validated by other observers. Nor do we have the spouses' or parents' ratings of the quality of these relationships to compare.

IV. B. Generalizability of Findings

In the nonclinical group very few subjects self-selected out of the study by refusing to participate or failing to complete the questionnaire. Almost no nonclinical subjects had to be rejected because of failure to meet selection criteria. Although the author attempted to obtain a broad, representative nonclinical sample, we must remember that it is not a random sample. We do not know the degree to which this group is representative of the general population.

In the clinical group a few subjects elected not to participate. However, what was more problematic in obtaining sufficient clinical subjects was the author's rejection of patients who could not meet the selection criteria: for example, patients who could not speak, read, and write English; patients who were handicapped in some way which prevented questionnaire completion; patients who were drug dependent to the point of cognitive impairment; and patients who had had instruction in the use of imagery. Thus, this chronic pain sample was more selective than the author would have liked but probably not more so than he could have reasonably and practically avoided. In fact, the chronic pain sample was comparable to other chronic pain patient groups with respect to age, proportion of males to females, and presence of multiple pain locations (e.g., Catchlove et al., 1985; Fordyce et al., 1981; Heaton et al., 1982). Although researchers have employed various methods to assess SES across studies, many of these researchers found, as the current author did, skewed scores, indicating lower SES in pain patient groups (e.g., Heaton et al.,

1982). Duration of pain ($M = 6$ years) in the population from which the present sample was taken is also comparable to other pain patient groups (e.g., Catchlove et al., 1985; Fordyce et al., 1981; Heaton et al., 1982). However, it is still important for researchers to carry out similar research with other chronic pain samples. Considering that many researchers have suggested a relationship between alexithymia and patients with psychosomatic, somatizing, and other psychological problems, researchers also need to repeat the current study with clinical groups other than chronic pain samples.

Because the major findings in the current study are similar in the analyses of data for both the clinical group and the nonclinical group, we can be more certain of these findings. The results appear not to be because of clinical status. In other words, they are not due to alexithymia resulting from long-term illness, sometimes referred to as secondary alexithymia. Rather, the major results apply, in the main, to both clinical subjects and nonclinical subjects.

V. Concluding Comments

From the results of this study we know that measures of alexithymia and measures of directed imagery do not correlate with each other. We can clearly infer then, that the alexithymia construct does not include deficits in directed imagery as has previously been suggested.

Non-directed or spontaneous, negative, daydream imagery does appear to be related to an increased degree of alexithymic deficits. There is also an increased proportion of daydream imagery, which appears then to be emotionally negative in tone. Furthermore, we found that poor attention to internal processes is also associated with alexithymia. Thus, the negative, emotionally toned daydream imagery may involve worry, confusion, and other such unproductive and unfocused mental processes. This appears to be related to an alexithymia which is most clearly defined by an increased difficulty identifying feelings and differentiating them from

bodily sensations, and an increased difficulty communicating feelings. Finally, a decreased capacity for fantasy useful in the resolution of internal conflicts appears to also be related to an increased degree of these alexithymic traits, at least in the clinical group.

These results help to draw a clearer clinical picture of those who exhibit alexithymic characteristics. The constellation of psychological features which emerges suggests a painful inner world in which these individuals experience difficulty differentiating psyche and soma, coupled with an increase in emotionally painful, spontaneous imagery but an inability to focus effectively on this inner world and use the imagery and fantasy constructively to resolve conflict, and thus, to reduce anxiety.

Whether these individuals' ability to generate directed imagery or their spontaneously occurring painful daydream imagery may provide a means for therapeutic intervention into their painful interior world remains to be seen.

The present results indicate that future researchers should be cognizant of the complexity of imagery phenomenon and not make blanket statements to the effect that "imagery" deficits are involved in alexithymia deficits. These results also suggest the need to exercise more caution in generalizing from conclusions about the relationship between imagery and alexithymia that are based on observations of neurologically traumatized patients. Imagery deficits and alexithymia deficits in such patients may have very different etiologies. For example, imagery deficits in such patients may be the result of the brain trauma, whereas alexithymia may be the psychological reaction to such trauma.

The results of this study further suggest that we should give much careful consideration to redefining the alexithymia construct. For example, we must question the four-factor model of alexithymia. The concreteness subscale appears hardly related to the other components of alexithymia. Also, the daydream subscale scores were in the opposite direction to scores on the

other three subscales. Finally, the body/feelings subscale and the communicate feelings subscale are so highly correlated that we must question whether the alexithymia construct should include these two components separately. The present study has shown that the Toronto Alexithymia Scale can be open to influence by a number of social and demographic variables, as can the SAT9. Future researchers should take this into consideration. We must redefine the alexithymia construct if it is to be of use in future clinical practice and research.

VI. Directions for Future Research

Confirmation of the current findings, through replication with other groups of clinical and nonclinical subjects, is an important next step in this area of research. In looking further at the relationship between alexithymia and imagery, researchers may find it useful to explore the effect of powerful affect on this relationship. This could be done through the use of imagery that has some personal meaning to the subjects in such a way that anxiety or another strong affect is elicited. Ashen (1985) has suggested that such imagery is qualitatively different from directed imagery and is closely related to the richness of inner life and to success in therapy. Therefore, the elicitation of imagery in such an affective context may be more closely related to any imagery deficits in subjects with a substantial degree of alexithymia. This raises the issue of the relationship between alexithymia and treatment variables, which future researchers could explore.

As mentioned above, we need to explore more fully the alexithymia construct. It is not yet clear whether this is a coherent construct in which all components of the four-factor model used here occur together. In order to determine this, we need to conduct further research on the measurement of alexithymia.

The labeling of alexithymic traits as "pathological," as a "deficit," or as, in some way, a "problem", reflects a value stance of the dominant culture. Alexithymic traits may be a reflection

of values different from the majority culture. That is, alexithymic individuals' value orientation may place a higher premium on "behaviour" (doing) and "things," rather than on talking about feelings and interpersonal relationships. Researchers might wish to examine the relationship between relevant value-orientations and alexithymic traits. This could be especially important if alexithymic traits, in the end, are not found to be consistently related to psychosomatic illness, somatic complaints, or other difficulties.

Finally, field data on the natural occurrence of imagery in clinical and nonclinical subjects who exhibit a significant degree of alexithymic traits would be useful. Such naturalistic assessments or journal-style self-reports of imagery occurring in the stream of consciousness, such as Singer (1974) carried out with normal subjects, could provide important insights into the ongoing cognitive and affective processes of individuals with alexithymic traits.

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Appendix A
COVERING LETTER

Dear Participant,

Please take a few moments of your time to read this letter. We are inviting you to participate in a research study. We are using the enclosed questionnaire to do research on mental imagery. Your participation will help provide important information about peoples' typical use of imagery. We are asking you to fill in this questionnaire, which should take you about 75 minutes to complete.

More information on the research is provided in the attached consent form. If you agree to participate in the study, please read and sign the two copies of the consent form. Return one signed copy to us along with the completed questionnaire, and keep the second copy of the consent form for your own information.

We greatly appreciate your contribution to this research. We hope you will find it to be an interesting and enjoyable experience.

Researchers: Kirk Bates, M.A.

William Balance, Ph.D.

Appendix B
CONSENT FORM

Research Study
Mental Imagery in Pain Patients
CONSENT FORM

Researchers: Kirk Bates, M.A.
William Balance, Ph.D.

I am being asked to participate in a research study that involves filling in a questionnaire primarily concerned with mental imagery. My participation in this study will help provide information about what kinds of imagery the average person has. Understanding imagery better will eventually lead to better methods for helping patients with different kinds of problems. The questionnaire should take about 75 minutes to complete.

I understand that the information gathered from this questionnaire is confidential and will not be revealed to anyone in a way which could identify me. Absolutely no information that identifies me personally will be disclosed to anyone. No one but Kirk Bates and his assistant will see my answers. Because I am being instructed not to put my name on the questionnaire, they will not know which answers are mine. I understand that Kirk Bates will be available to answer any questions I might have about the study. If I want to know the results of the study, which are expected to be available in December, 1988, I can get a report on the study by calling Kirk Bates at (519) 253-4232, ext. 2216.

This study simply asks me to complete a questionnaire. In the *unlikely* event of any injury resulting from the research, no reimbursement, compensation or free medical treatment is offered by Wayne State University or Harper Hospital. However, I am aware that this study only involves completing a questionnaire and that no physical treatments or invasive procedures will be used. I know that if I decide not to participate in the study my treatment will not be affected in any way. I also know that if I agree to participate in the study my treatment will not be affected. I further understand that I can stop my participation in the study at any time without this affecting

my treatment. I will receive a copy of this consent form if I participate in the study. My participation is voluntary and I willingly agree to take part in the study.

Name (Please Print): _____

Signature: _____

Date: _____

Witness' Name (Please Print): _____

Witness' Signature: _____

Please Keep One Copy of the Consent Form
Please Return One Copy of the Consent Form
With the Completed Questionnaire

(Page 2 of 2)

Appendix C

ORDER OF PRESENTATION OF MEASURES IN QUESTIONNAIRE

Demographic and Social Questions**Toronto Alexithymia Scale (alexithymia scale)**

- body/feelings subscale
- communicate feelings subscale
- daydream subscale
- concreteness subscale

Human Information Processing Survey (cognitive style scales)

- left hemisphere scale
- right hemisphere scale
- integrated scale

Questionnaire on Mental Imagery (sensory imagery scales)

- visual imagery subscale
- auditory imagery subscale
- cutaneous imagery subscale
- kinesthetic imagery subscale
- gustatory imagery subscale
- olfactory imagery subscale
- organic imagery subscale

Short Imaginal Processes Inventory (daydream imagery scales)

- positive daydream imagery
- negative daydream imagery
- poor attention scale

Imaginal Representational Scales

- figural imagery scale
- symbolic imagery scale
- mimetic imagery scale

Scored Archetypal Test with 9 Elements (SAT9)

- fantasy

Appendix D

SUMMARY OF ANALYSES OF COVARIANCE ON GROUPS

Table D.1

Summary of Analysis of Covariance on Groups for the Alexithymia Scale with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	2913.85	4	728.46	6.70**
Main Effects (Group)	171.54	1	171.54	1.58
Covariate	2742.31	3	914.10	8.41**
SES	2100.09	1	2100.09	19.32**
SDS	20.22	1	20.22	0.19
Age	802.23	1	802.23	7.38*
Residual	11633.93	107	108.73	
Total	14547.68	111	131.06	

* $p < .01$; ** $p < .001$;

Table D.2

Summary of Analysis of Covariance on Groups for the Body/ Feelings Subscale with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	1558.99	4	389.75	6.00*
Main Effects (Group)	84.36	1	84.36	1.30
Covariate	1474.63	3	491.54	7.57*
SES	1304.70	1	1304.70	20.09*
SDS	238.26	1	238.26	3.67
Age	184.03	1	184.03	2.83
Residual	6949.58	107	64.95	
Total	8508.56	111	76.65	

* $p < .001$;

Table D.3

Summary of Analysis of Covariance on Groups for the Communicate Feelings Subscale with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	230.79	4	57.70	2.50*
Main Effects (Group)	0.53	1	0.53	0.02
Covariate	230.27	3	76.76	3.33*
SES	168.52	1	168.52	7.32**
SDS	96.25	1	96.25	4.18*
Age	9.72	1	9.72	0.42
Residual	465.07	107	23.04	
Total	2695.86	111	24.29	

* $p < .05$; ** $p < .01$;

Table D.4

Summary of Analysis of Covariance on Groups for the Daydream Subscale with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	497.07	4	124.27	8.69***
Main Effects (Group)	88.58	1	88.58	6.19*
Covariate	408.50	3	136.17	9.52***
SES	0.15	1	0.15	0.01
SDS	211.60	1	211.60	14.79***
Age	114.91	1	114.91	8.03**
Residual	1530.60	107	14.31	
Total	2027.68	111	18.27	

* $p < .05$; ** $p < .005$; *** $p < .001$;

Table D.5

Summary of Analysis of Covariance on Groups for the Concreteness Subscale with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	60.16	4	15.04	0.96
Main Effects (Group)	16.43	1	16.43	1.05
Covariate	43.72	3	14.57	0.93
SES	21.13	1	21.13	1.35
SDS	2.41	1	2.41	0.15
Age	16.41	1	16.41	1.05
Residual	1676.34	107	15.67	
Total	1736.49	111	15.64	

Table D.6

Summary of Analysis of Covariance on Groups for the Fantasy Test (SAT9) with SES, SDS, and Age as Covariates

Source of Variation	SS	df	MS	F
Model	68.41	4	17.10	14.05***
Main Effects (Group)	9.48	1	9.48	7.79**
Covariate	58.93	3	19.64	16.13***
SES	38.55	1	38.55	31.66***
SDS	8.15	1	8.15	6.69*
Age	4.32	1	4.32	3.55
Residual	130.28	107	1.22	
Total	198.69	111	1.79	

* $p < .05$; ** $p < .01$; *** $p < .001$;

Appendix E
SUMMARY OF ANALYSES OF COVARIANCE ON PAIN
EVALUATION

Table E.1

Summary of Analysis of Covariance on Pain Evaluation for the Alexithymia Scale with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	1158.22	3	386.07	3.03*
Main Effects (Pain Evaluation)	78.99	1	78.99	0.62
Covariate	1079.23	2	539.62	4.23*
SES	944.32	1	944.32	7.40**
SDS	123.27	1	123.27	0.97
Residual	7403.21	58	127.64	
Total	8561.44	61	140.35	

* $p < .05$; ** $p < .01$;

Table E.2

Summary of Analysis of Covariance on Pain Evaluation for the Body/Feelings Subscale with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	1235.93	3	411.98	4.94*
Main Effects (Pain Evaluation)	104.87	1	104.87	1.26
Covariate	1131.05	2	565.53	6.79*
SES	846.90	1	846.90	10.16*
SDS	268.01	1	268.01	3.22
Residual	4833.96	58	83.34	
Total	6069.89	61	99.51	

* $p < .005$;

Table E.3

Summary of Analysis of Covariance on Pain Evaluation for the Communicate Feelings Subscale with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	311.16	3	103.72	4.35**
Main Effects (Pain Evaluation)	7.11	1	7.11	0.30
Covariate	304.05	2	152.02	6.37***
SES	128.10	1	128.10	5.37*
SDS	170.94	1	170.94	7.17**
Residual	1383.61	58	23.86	
Total	1694.77	61	27.78	

* $p < .05$; ** $p < .01$; *** $p < .005$;

Table E.4

Summary of Analysis of Covariance on Pain Evaluation for the Daydream Subscale with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	215.64	3	71.88	4.21**
Main Effects (Pain Evaluation)	59.77	1	59.77	3.50
Covariate	155.87	2	77.93	4.56*
SES	32.68	1	32.68	1.91
SDS	121.05	1	121.05	7.08**
Residual	991.41	58	17.09	
Total	1207.05	61	19.79	

* $p < .05$; ** $p < .01$;

Table E.5

Summary of Analysis of Covariance on Pain Evaluation for the Concreteness Subscale with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	145.08	3	48.36	3.07*
Main Effects (Pain Evaluation)	104.65	1	104.65	6.65*
Covariate	40.43	2	20.21	1.29
SES	35.31	1	35.31	2.25
SDS	5.58	1	5.58	0.35
Residual	912.28	58	15.73	
Total	1057.36	61	17.33	

* $p < .05$;

Table E.6

Summary of Analysis of Covariance on Pain Evaluation for the Fantasy Test (SAT9) with SES and SDS as Covariates

Source of Variation	SS	df	MS	F
Model	26.34	3	8.78	14.70*
Main Effects (Pain Evaluation)	2.04	1	2.04	3.42
Covariate	24.29	2	12.15	20.34*
SES	23.06	1	23.06	38.62*
SDS	1.41	1	1.41	2.37
Residual	34.63	58	0.60	
Total	60.97	61	1.00	

* $p < .001$;

Appendix F
MEAN SCORES ON RELATIONSHIP STATUS FOR ALEXITHYMIA
VARIABLES

Table F.1

Mean Scores on Relationship Status for the Alexithymia Scale and Subscale Scores and the Fantasy Test (SAT9) for the Clinical Group. F Based on SES and SDS Partialled Out

Variable	Overall Mean (N=60)	With Mean (N=33)	Without Mean (N=27)	F	p
Alexithymia Scale	68.23	70.42	65.56	3.02	.09
Alex-Body Feelings Subscale	29.65	30.79	28.26	1.79	.19
Alex-Communicate Feelings Subscale	17.75	18.30	17.07	2.53	.19
Alex-Daydream Subscale	14.73	14.67	14.81	0.60	.44
Alex-Concreteness Subscale	14.28	15.24	13.11	3.05	.09
Fantasy Measure (SAT9)	-0.45	-0.43	-0.47	2.34	.13

Note. With = with a relationship, Without = without a relationship; SES = socioeconomic status, a higher SES score = higher status; SDS = social desirability scale, a higher SDS score = greater need to appear socially desirable; higher mean scores on the alexithymia scale and its subscales = greater degree of alexithymia, whereas the reverse is true of the SAT9;

Table F.2

Mean Scores on Relationship Status for the Alexithymia Scale and Subscales and the Fantasy Test (SAT9) for the Non-clinical Group, F Based on SES and SDS Partialled Out

Variable	Overall Mean (N=47)	With Mean (N=23)	Without Mean (N=24)	F	p
Alexithymia Scale	61.53	60.26	62.75	0.44	.52
Alex-Body Feelings Subscale	25.98	24.57	27.33	1.94	.18
Alex-Communicate Feelings Subscale	17.26	16.30	18.17	1.53	.23
Alex-Daydream Subscale	11.43	12.35	10.54	4.38	.05
Alex-Concreteness Subscale	14.26	14.26	14.25	0.00	.99
Fantasy Measure (SAT9)	0.82	0.99	0.66	0.23	.64

Note. For abbreviations and direction of scoring see Table F.1;

VITA AUCTORIS

Kirk Bates was born on July 16, 1951, at Middle Musquodoboit, Nova Scotia, the son of A. Ross Bates and M. Ellie (Fleming) Bates. He attended Musquodoboit Rural High School, completing grade 12 in the spring of 1969. Kirk graduated from Dalhousie University, Halifax, N.S., with a First Class Honours B.A. in 1980 and was awarded the Dalhousie University Silver Medal. He completed his M.A. and Ph.D. at the University of Windsor, Windsor, Ontario, in 1983 and 1989, respectively.